2131e

tag

Teaching About Garbage

PRIMARY DIVISION

MODULE 1

Ontario

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Teaching About Garbage

FOREWORD

FOREWORD

Picture this: Every year residents, industries, businesses, institutions and governments in Ontario produce enough garbage to fill Toronto's Skydome stadium twice the height of the CN Tower.

Now picture this: a backhoe ripping into topsoil that once was used to grow crops; a bulldozer pushing mounds of garbage into an excavated space that is to be eventually covered again with earth; a nearby stream polluted with the run-off of toxic "leachate" from the landfill site; a school yard contaminated with lead, mercury and other toxic substances from a nearby incinerator ...

These are the apocalyptic images of a garbage crisis. Anyone who has visited a landfill site or a waste transfer station can attest to their accuracy. We now know that there are limits to how much resource depletion and waste disposal the natural environment can withstand. Today we have to deal with the consequences. There is no more "away"; nowhere for the garbage to go.

Garbage, or what engineers and planners call "municipal solid waste," refers to materials that people no longer consider valuable or useful. So we classify used materials as garbage or waste by putting them into a garbage container for collection and ultimate disposal. However, it's far more desirable to keep used materials out of the garbage container in the first place. This means changing the way we think about garbage from "out of sight, out of mind" to thinking about resources and alternative uses.

Understanding this simple principle is a first step, but how far are we willing to go to change those attitudes and behaviours conditioned by decades of convenience and easy disposal? The answer lies in making thoughtful choices as individuals and as a society. It is, therefore, important that young people – the citizens and leaders of tomorrow– learn to make the right choices based on caring and careful thinking. And you, as an educator, have an important role to play in their education as citizens in a conserver society.

"Teaching About Garbage", or TAG, is a program developed for classroom use by the Ministry of the Environment in partnership with the Ministry of Education. The TAG program attempts to integrate waste management topics into a variety of curriculum areas: science, mathematics, visual arts, music and literature, to name a few. It has been designed to be activity-based and child-centred. Though, as its name suggests, TAG's primary focus is on what is traditionally called "solid waste", it also covers topics related to the management of hazardous, industrial, liquid and gaseous wastes.

The priority of TAG is to have students develop a way of life which will result in reducing their resource consumption. If we can do this, the environmental damage which accompanies the extraction and processing of resources will be reduced. Children must feel that their actions to reduce, reuse and recycle can make a difference. This theme should be repeatedly emphasized in all the suggested activities.

In order of priority, children should learn how to:

1. identify and reduce wasteful consumption and the environmental impacts of garbage;
2. reuse products and packaging in as many imaginative ways as possible to keep them from becoming garbage;
3. select used materials that can be recycled and see that they are properly separated from garbage; and
4. dispose of the "residual waste" (used materials which cannot be reused or recycled any more) in the most environmentally responsible way.

These learning outcomes quite purposefully follow what is known as the "3Rs hierarchy" of waste management – reduce, reuse and recycle. Only after we have done everything possible to keep a used material from entering the waste stream, do we properly dispose of the residual or leftover waste.

When fully developed, the TAG program will consist of six modules for use in Ontario's school system. You are now reading the first of these modules for children in the primary division (grades K-3). It has been reviewed by an advisory group of educators and tested in a number of schools. A module for the junior division (grades 4-6) has also been developed and tested. Four more TAG modules will be developed in successive order for the "Transition Years" (grades 7-9), and for the science, social studies, and business and arts programs in the "Specialization Years" (grades 10-Graduation).

Before using this module, read the Teacher's Guide carefully. Find out if your board or school has a "TAG Co-ordinator". This is someone who has been trained to use the module. It is also the role of TAG Co-ordinators to spread the word through professional development seminars and conferences.

If you want to set up a recycling project in your school or school board, your school or school board may be eligible to obtain financial and technical support for recycling from the Ministry of the Environment. The Student Action for Recycling (STAR) program has been designed to help establish "board-level" recycling programs involving a number of "school-level" recycling projects. You can obtain the STAR information kit from the ministry's Public Information Centre at (416) 323-4321 or 1-800-565-4923. However, only school boards, independent schools and provincial schools which do not come under the jurisdiction of a board are eligible to apply for support under the STAR program. Ask your school board to submit an application. If your school is not under the jurisdiction of a school board, you can apply directly to the Ministry of the Environment.

The STAR information kit also contains an order form for educational support materials which you may order whether or not your school or school board is part of the STAR program.

As a teacher, your involvement in motivating students to actively investigate, question and to find answers to one of society's biggest problems is of fundamental importance to the success of the TAG program. From the perspective of the Ministry of the Environment, education is an important means for achieving the Ontario Government's targets of at least 25 per cent reduction of waste in 1992 and at least 50 per cent by the year 2000. Likewise, TAG is a tool that can be effectively used to reach one of the goals of Ontario's school system: the development of respect for the environment and commitment to the wise use of resources. Moreover, we hope that the suggested teaching activities will heighten student awareness of environmental issues beyond the scope of waste management to foster the values of social responsibility and co-operation.

Picture this: a family which puts out only one partially-full garbage bag per month, because that is all it has for disposal; a garden of tomatoes and cabbages fertilized by compost derived from kitchen scraps; a hardware store which advertises that almost all of its products are made from recycled materials; a section in the Museum of Civilization displaying archaeological artifacts of an ancient, highly-developed "throw-away society" ...

ACKNOWLEDGEMENTS

The Ministry would like to acknowledge the contributions of the following advisors in making this project a reality.

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Ministry of the Environment

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Education Officer
Ministry of Education

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Public Education Adviser
Public Affairs & Communications
Services Branch
Ministry of the Environment

Morris Ilyniak
Manager, Waste Communications
Public Affairs & Communications
Services Branch
Ministry of the Environment

FOR ADDITIONAL COPIES

For more copies of this module or other TAG modules, please contact:

Teaching About Garbage,
Public Affairs and Communications Services Branch
Ministry of Environment and Energy
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
Telephone: 416-323-4663
or 1-800-565-4923

Teaching About Garbage

TEACHER'S GUIDE

OVERVIEW OF PROGRAM PRINCIPLES

TEACHING ABOUT GARBAGE IS:

ACTIVITY-BASED involving children in hands-on learning experiences;

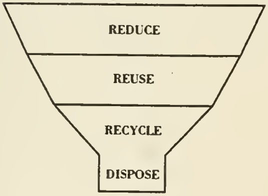
AND

CHILD-CENTRED taking into account the interests, curiosities and abilities of children while inviting and encouraging their input and evaluation

TEACHING ABOUT GARBAGE encourages children to work in a variety of ways: independently, cooperatively in pairs, and in small and large groups, inviting opportunity for discussion, experimentation, sharing and reaching common goals.

The organizational structure is such that the four areas of Reduce, Reuse, Recycle and Dispose are addressed and expanded through the activities at each level of the module.

This diagram represents the waste managment hierarchy.



At each level of the hierarchy, the students' understanding continues to deepen as does their ability to transfer and apply new learning to everyday living. Concepts become useful and meaningful when students have opportunities to learn using materials from their own environment. The activities have been designed to invite children to interact, investigate, seek solutions, solve problems, design, discover, ask questions, develop positive attitudes and evaluate their own and others' thinking.

The activities have been designed for the three levels of primary education (grades 1, 2 and 3), but it is left to the individual teacher to choose the most appropriate ones for the children and to modify or adapt the activities to meet their many interests and abilities. For example, you may be teaching grade two, but you may be selecting activities from the level one or level three activities, as they might be more appropriate for your class.

Each level has a cover page which outlines the waste management hierarchy. The themes for each level are highlighted in bold print and the activities listed below each title relate directly to that level of the hierarchy.

ORGANIZATIONAL FORMAT FOR EACH ACTIVITY

Teaching About Garbage includes 21 activities for the primary division. Each activity has three sections: Teacher Information, Student Activity and Learning Connections. The format for each of the sections is explained below.

TEACHER INFORMATION

Activity Title

ACTIVITY AT A GLANCE

A brief statement of what the activity is about.

ENVIRONMENTAL FOCUS

A statement of the waste managment focus for the activity.

LEARNING OUTCOME

A simple statement of what the students should understand as a result of doing the activity.

BACKGROUND INFORMATION

Waste management facts relevant to the specific activity.

ACTIVITY CLASSIFICATION

Each activity is designated as to whether it involves the whole class, a small group or an individual student.

KEY VOCABULARY

Key words with which the students should become familiar. Those that are marked with an asterisk can be found in the glossary.

TEACHER TIPS

Significant information that the teacher will need to take into account to set up the student activity.

STUDENT ACTIVITY

(Ready-to-use activity sheets for students)

There is an icon ☺ on each student activity sheet for easy reference.

INTRODUCTORY STATEMENT

This statement is often in the form of a rhyme and gives the theme of the activity.

WHAT YOU NEED

A list of the required material is provided

WHAT TO DO

Simple steps for the students to follow in the activity are outlined.

LEARNING CONNECTIONS

(For the teacher)

In this section connections are made with different subjects in the curriculum.

The learning connections offer further suggested activities for expansion of the waste management theme. Teachers are expected to implement the suggested activities using their own creativity and expertise.

CURRICULUM AREA HEADING

Each curriculum subject area has a consistent icon (see next page).

The communication connection often makes reference to children's literature books, most of which are listed in the annotated bibliography.

ONE STEP FURTHER

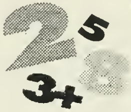
This is an added challenge for the highly motivated and intellectually curious children.

This is identified by a "footprint" in a shaded area.

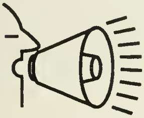
LITERATURE

VISUAL ART/
ARTS

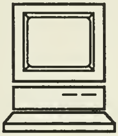
ENVIRONMENTAL
STUDIES



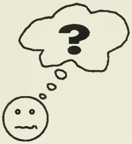
MATH



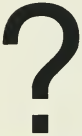
COMMUNICATION



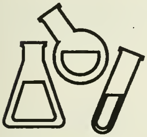
TECHNOLOGY



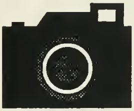
PROBLEM SOLVING/
CREATIVE THINKING



RESEARCH

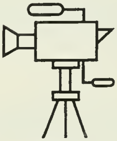


SCIENCE

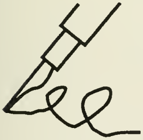


PHOTOGRAPHY

PHYSICAL EDUCATION



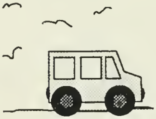
MEDIA



WRITING

MUSIC

DRAMA



FIELD TRIP

SOCIAL STUDIES

GEOGRAPHY

HEALTH

INVESTIGATION

ACTIVITIES AT A GLANCE

The following chart gives an overview of the activities for this module. The overview identifies the title and page number of the activity, provides a brief statement of the nature of the activity and designates the type of group, waste management focus and activity location.

KEY FOR THE CHART:

GROUP TYPE

I - individual
SG - small group
WG - whole group

WASTE MANAGMENT FOCUS

RD - reduce
RU - reuse
RC - recycle
D - dispose
IMP - environmental impact of waste

ACTIVITY LOCATION

CL - classroom
COM - community
EX - excursion
SY - school yard

LEVEL/ TITLE/PAGE	ACTIVITY AT A GLANCE	GROUP TYPE	WASTE MANAGEMENT	ACTIVITY LOCATION FOCUS
LEVEL 1				
Garbage Talk (p. 28)	By using their senses, children talk about and learn about garbage	SG, I	3 RU	CL
Litter, Litter Let's Not Litter (p. 32)	The children will clean up a littered area of the school yard.	I, WG	IMP	SY
Pop Goes the Lid (p.37)	The children pop 3 garbage cans and from each choose reusable materials to create something new.	SG, I	RU	CL
Garbage Gobbler (p.41)	Children are asked to feed the garbage gobbler but hopefully they don't feed it what it is asking for!	SG, I	RC/RU	CL
All The Way To The Landfill Site (p.45)	Children play in the classroon sandbox and dramatize garbage collection and disposal.	SG, I	D	CL
Rot or Not (p.50)	Children plant a variety of items to observe biodegradability of waste products.	I, SG, WG	RC	CL
Planet Protectors To The Rescue (p.54)	This short opperetta is intended to enhance the concept of caring about the environment. Children will come to understand that they too can make a difference and have an impact on others.	WG	3 Rs, D	CL

LEVEL/ TITLE/PAGE	ACTIVITY AT A GLANCE	GROUP TYPE	WASTE MANAGEMENT	ACTIVITY LOCATION FOCUS
LEVEL 2				
Sort It Out (p.66)	Children will sort through discarded waste looking for recyclable and reusable things.	I, SG	RC/RU	CL
Oops! It's Much Too Full (p.71)	Children observe the piling up of litter in the classroom and provide solutions to the problem.	SG, WG	D	CL
Mailosaurus (p.76)	Children paste junk mail onto a to-scale outline of a dinosaur.	WG, I	IMP	CL
Lunch Look (p.80)	The children examine their lunches for wrapping and packaging that could end up as garbage.	I	RD	CL
Magnificent Machine (p.85)	The children handle and play with models of garbage trucks identifying and naming truck parts.	SG, I	D	CL
Polluter Snooper (p.89)	Children will snoop around the playground looking for polluters.	I, WG	IMP	SY
Precious Pets (p.94)	Children create precious pets out of blown egg shells and learn the responsibility of caring for something so fragile.	I	IMP	CL/COM
LEVEL 3				
Proper Shopper (p.100)	The children will observe the shopping habits of an adult while accompanying him/her on a trip to the grocery store.	SG	RD	COM
Horrible Hazards (p.105)	The children will examine and identify hazardous household cleaners and sort them according to the universal symbols: toxic, flammable, corrosive, explosive.	SG, I	IMP	CL/ COM
Greener Cleaner (p.110)	The children will follow recipes for greener cleaners and make environmentally friendly products.	SG, I	IMP	CL
The Great Exchange (p.114)	The children will be involved in an exchange of toys and games.	WG	RU	CL
Paper Pulp Paper (p.119)	The children will learn how to make newspaper from recycled paper.	SG, I	RC	CL
Wormy Wonders (p.124)	The children will make their own composter.	WG	RC	CL
What's Buried Here (p.129)	The children will create a miniature sanitary landfill.	SG, I	D	CL

ATTITUDES, SKILLS AND KNOWLEDGE

The learning opportunities that are covered in the activities are summarized in the following tables.

The tables focus on three areas of learning opportunities – attitudes, skills and knowledge – as outlined in the Ontario Ministry of Education document, *Science Is Happening Here.*

LEARNING OPPORTUNITIES — KNOWLEDGE

	Energy	Space	Time	Matter	Community	Life	Change	Growth	Inter-relationships	Technology	Conservation
LEVEL 1											
Garbage Talk		●		●	●						●
Litter, Litter Let's Not Litter		●		●	●	●	●		●		●
Pop Goes The Lid				●			●			●	
Garbage Gobbler		●		●	●		●			●	●
All the Way to the Landfill Site	●	●	●	●	●	●	●	●	●	●	●
Rot or Not	●	●	●	●	●	●	●	●	●		
Planet Protectors		●		●	●	●	●		●		
LEVEL 2											
Sort it Out		●		●	●	●	●			●	
Oops! It's Much Too Full	●	●	●	●	●	●	●		●	●	●
Mailosaurus	●	●	●	●	●	●	●	●	●	●	●
Lunch Look				●	●	●	●				●
Magnificent Machine	●	●	●	●	●	●	●		●	●	●
Polluter Snooper		●		●	●	●	●		●		●
Precious Pets	●	●	●	●	●	●	●	●	●	●	●
LEVEL 3											
Proper Shopper		●		●	●	●	●			●	
Horrible Hazards		●		●	●	●	●	●	●	●	●
Greener Cleaners	●			●	●	●	●	●	●		●
The Great Exchange				●	●	●	●		●		●
Paper Pulp Paper	●	●	●	●	●	●	●	●	●	●	●
Wormy Wonders	●	●	●	●	●	●	●	●	●		●
What's Buried Here?	●	●	●	●	●	●	●	●	●	●	●

LEARNING OPPORTUNITIES — ATTITUDES

	Concern/ Care for Environment	Respect for Living Things	Consideration	Open-Mindedness	Accuracy	Thoroughness	Perseverance	Safety Mindedness	Curiosity	Risk-Taking
LEVEL 1										
Garbage Talk	•				•					
Litter, Litter Let's Not Litter	•	•	•				•	•		
Pop Goes The Lid	•									
Garbage Gobbler	•		•							
All the Way to the Landfill Site	•		•		•			•		
Rot or Not	•		•			•	•			
Planet Protectors	•	•	•				•	•		
LEVEL 2										
Sort it Out	•		•	•	•	•				
Oops! It's Much Too Full	•		•	•		•	•		•	
Mailosaurus	•		•	•					•	
Lunch Look	•		•	•		•				
Magnificent Machine	•						•		•	
Polluter Snooper	•		•		•	•	•		•	•
Precious Pets	•	•	•		•	•	•	•		•
LEVEL 3										
Proper Shopper	•	•	•	•						
Horrible Hazards	•	•	•		•	•	•	•		•
Greener Cleaners	•		•		•	•		•		
The Great Exchange	•		•							
Paper Pulp Paper	•		•			•				
Wormy Wonders	•	•	•			•				
What's Buried Here?	•		•							

LEARNING OPPORTUNITIES — SKILLS

	Observating	Classifying	Seriating	Communicating	Measuring	Inferring	Predicting	Hypothesizing	Experimenting	Controlling Variables	Interpreting	Making Models	Manipulating Equipment & Materials
LEVEL 1													
Garbage Talk	•	•	•	•			•				•		•
Litter, Litter, Let's Not Litter	•	•	•	•			•				•		•
Pop Goes The Lid	•	•		•	•		•		•		•	•	•
Garbage Gobbler	•	•		•			•				•		•
All the Way to the Landfill Site	•			•			•		•	•	•	•	•
Rot or Not	•	•		•			•		•	•	•		•
Planet Protectors				•	•						•		•
LEVEL 2													
Sort it Out		•	•	•			•				•		•
Oops! It's Much Too Full	•	•		•		•	•	•					•
Mailosaurus	•			•	•		•				•	•	•
Lunch Look	•	•	•	•			•			•			•
Magnificent Machine	•			•	•		•				•	•	•
Polluter Snooper	•			•			•	•		•			•
Precious Pets	•			•			•					•	•
LEVEL 3													
Proper Shopper	•			•			•						•
Horrible Hazards	•	•		•			•			•	•		•
Greener Cleaners	•	•		•	•		•		•	•	•		•
The Great Exchange	•	•		•			•						•
Paper Pulp Paper	•	•		•			•				•		•
Wormy Wonders	•			•	•		•		•		•	•	•
What's Buried Here?	•	•		•	•		•		•		•	•	•

EVALUATION

The learning experiences in Teaching About Garbage are activity-based and child-centred. Therefore, assessment and evaluation of the children's participation and growth should occur primarily through teacher observation, teacher-child interaction and sharing of experiences. By assisting, questioning, fostering inquiry and encouraging verbalization of processes, the teacher will be able to acquire insight into children's development of knowledge, skills and attitudes.

Assessment and evaluation should be diagnostic, formative and summative. Using this combination of evaluative techniques the teacher will be successful in assessing the progress of all students.

Through diagnostic evaluation the teacher will discover the children's background knowledge, the experience that they bring to new learning situations, as well as verbal ability, interest level and what the children hope to learn.

Formative evaluation in the form of anecdotal records, portfolios of dated work samples, conference logs and self-evaluation records not only assists with program development, but also with the interpretation of behaviour patterns and attitudes.

Summative evaluation gives conclusive evidence of a child's progress. The teacher may examine specific work samples, assignments, student tracking sheets and end of unit quizzes where students are challenged to think and use information, to summarize ideas, to defend statements, to discuss topics of interest and to question issues and solutions.

Self-evaluation by the children is an important part of the evaluation process. Much insight is gained by having children express opinions and offer solutions about their own interests and learning outcomes. Information can be obtained through verbal exchange or by written records.

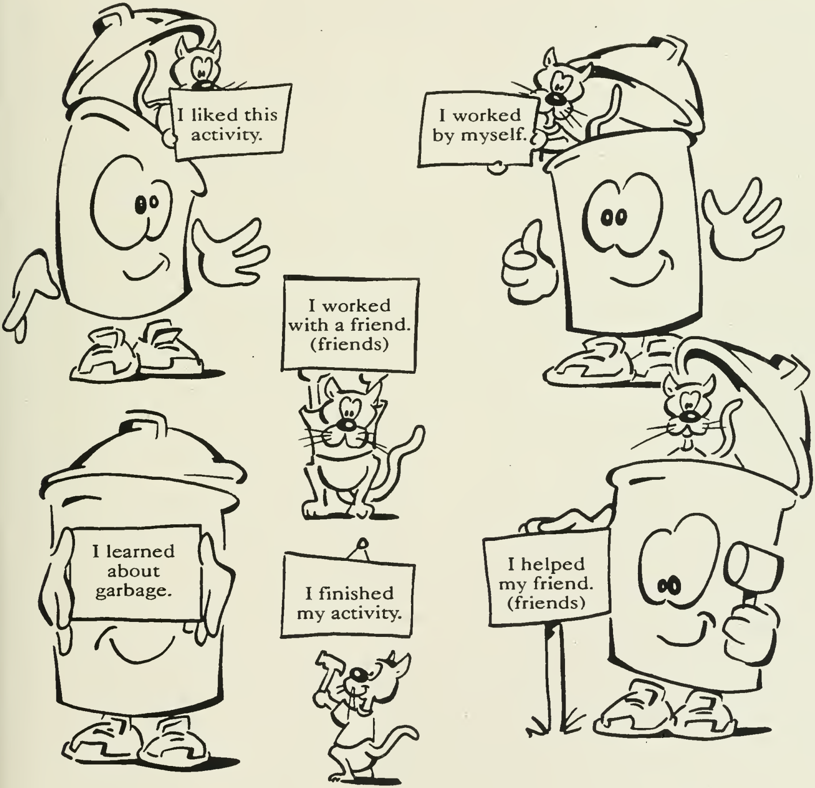
Five evaluation tools follow:

- Student Evaluation Form "Colour With TAG" – (students are responsible for colouring in the appropriate garbage can)
- Student Evaluation Form – (Grade 3 students would be expected to complete this form on their own)
- Group Evaluation Form – (the co-operative group is responsible for the completion of the form and any one member should be prepared to defend their responses)
- Teacher Group Observation Form – (teachers focus on 4-8 students, noting specific behaviours related to the attitudes, skills and knowledge checklists)
- Teacher Observation Summary Sheet – (this sheet is used for one student at a time and the teacher makes brief notes related to each category. Categories can be changed and modified if need be. Refer to skills, attitudes and knowledge charts.)

Evaluation forms should be kept on file and used for program modification as well as on-going assessment and parent/teacher interviews.

STUDENT EVALUATION FORM
"COLOUR WITH TAG"

MY NAME IS : ____


I liked this activity.
I worked by myself.
I worked with a friend. (friends)
I learned about garbage.
I finished my activity.
I helped my friend. (friends)

STUDENT EVALUATION FORM

MY NAME IS: ____________________

TODAY IS: ____________________

THIS IS WHAT I DID:

____

____

____

____

THIS IS WHAT I LIKED:

____

____

____

____

THIS IS WHAT I DID NOT LIKE:

____

____

____

____

THIS IS WHAT I LEARNED:

____

____

____

____

GROUP EVALUATION FORM

	☺	☹
We shared.	☐	☐
We took turns.	☐	☐
We helped each other.	☐	☐
We finished the activity.	☐	☐
We said nice things to each other.	☐	☐
We learned something new.	☐	☐

TEACHER OBSERVATION FORM

Date: ____________________

Student:	Student:
Student:	Student:
Student:	Student:
Student:	Student:

TEACHER OBSERVATION SUMMARY SHEET

Student Date

Social Interaction

Work Habits

Interest Span

Communication Skills

Attitudes

Skills

Knowledge

Learning Outcome

MATERIALS FOR TAG

The following summarizes the materials needed to do activities from this module. The required materials are also identified with each activity.

LEVEL 1

Art Materials

- glue, tape, mural paper, crayons, paper, popsicle sticks, cloth for costumes, sand box, other construction materials

Toys

- garbage trucks, recycling trucks, tractors, bulldozers, toy houses, blue boxes

Waste Management Materials

- garbage bags filled with different types of garbage, sorting hoops, 3 pop-up garbage cans, recycling box, used flower pots, garbage cans, protective gloves

LEVEL 2

Art Materials

- chart paper, scissors, glue, pencils, markers, scrap book, mural paper, counters, cardboard rolls, egg cartons, plasticine, blown eggs

Toys

- models of garbage trucks

Waste Management Materials

- recyclable items, reusable materials, garbage can, garbage bags, blue recycling box, junk mail, protective gloves

LEVEL 3

Art Materials

- pencils, clipboard, labels, straws

Toys

- used toys

Waste Management Materials

- household cleaners, white vinegar, pure soap flakes, washing soda, olive oil, measuring cups, jars and lids, rags, red worms, soil, clay, protective gloves

HEALTH AND SAFETY PRECAUTIONS

The following activities involve special attention to health and safety precautions:

LEVEL 1

Garbage Talk

- make sure that all material is safe to handle.

Litter, Litter, Let's Not Litter

- survey area prior to activity to ensure no dangerous debris.
- gloves provide protection when handling materials.

LEVEL 2

Rot or Not

- supply protective gloves for added safety.

LEVEL 3

Horrible Hazards

- adult supervision is necessary.

LETTER TO PARENTS

The following is a sample letter which could be sent home, prior to the study of the waste management unit, to inform parents as well as to encourage their contribution and support.

Dear Parents:

Environmental awareness is an issue that touches each of us individually as well as globally. To heighten both awareness and understanding, our school is participating in a program of study produced by the Ministry of the Environment entitled "Teaching About Garbage." The program addresses the hierarchy of waste management – reduce, reuse, recycle – and offers hands-on activities for children from Grades 1 to 3.

The activities have been designed to teach children to interact, investigate, seek solutions, solve problems, design, discover, ask questions, develop positive attitudes and evaluate their own and other's thinking. Through their involvement, the children will transfer and apply new learning to everyday living both at home and in the wider community.

We encourage your interest and contribution to the program. Some of the activities will involve your participation at home and we thank you in advance for your time and co-operation.

Yours sincerely,

STUDENT ACTIVITIES

LEVEL 1

The bold titles tell the waste management story for each level. The appropriate activity titles are listed below each bold title.

LET'S FIND OUT ABOUT GARBAGE
GARBAGE

LET'S LOOK FOR IT IN OUR OWN BACKYARD!
LITTER, LITTER, LET'S NOT LITTER

LET'S REDUCE IT, LET'S REUSE IT!
POP GOES THE LID

LET'S RECYCLE IT!
GARBAGE GOBBLER

LET'S DISPOSE OF IT!
ALL THE WAY TO THE LANDFILL SITE

WE BURY IT
PLANET PROTECTORS TO THE RESCUE

GARBAGE TALK

ACTIVITY AT A GLANCE

By using their senses, children talk about and learn about garbage.

ENVIRONMENTAL FOCUS

What is garbage?

LEARNING OUTCOME

The children will have a sense of what comprises garbage.

BACKGROUND INFORMATION

"Leftovers" are generated at each stage in our use of materials, from obtaining the raw materials and their processing to their abandonment as used items. These leftovers are called garbage, trash, scrap, junk, waste, sewage ... etc., depending on what and where and who is describing them. Some can be reused, some recycled and some have to be stored or disposed of in some way.

The average Canadian produces 1.7 tonnes of waste every year. This is the highest per capita rate in the world. The amount of garbage produced by nine people in a year would fill garbage cans piled as high as the CN Tower in Toronto.

Approximately one-third of domestic waste is paper, one-third is organic waste and the final third is glass, metal, plastic and wood. Residential waste makes up approximately 40% of Ontario's total waste stream; the rest comes from industry, business and institutional sources.

Materials which can be recycled – depending on availability of local recycling facilities – are paper, newspaper, corrugated cartons, high grade office papers, aluminum cans, steel cans, glass and plastics. Yard wastes, such as grass clippings, can be placed in composters where they are broken down by natural processes.

GARBAGE TALK

tag
Teaching About
Garbage

ACTIVITY CLASSIFACTION

Small Group
Individual

KEY WORDS

* Garbage
Sort
* Reduce
* Reuse
* Recycle
Touch
Smell
Look

TEACHER TIPS

Prepare six small tied bags of garbage, each with a variety of dry and safe-to-touch items that can be sorted three ways. (Three such ways might include things that can be reused, recycled or disposed of.) Try to include items such as boxes, paper and rags as well as other items that children would be familiar with and that they may have seen being disposed of at home such as: cans, jars, toilet paper rolls, plastic bottles, plastic wrap and candy wrappers.

Provide small hoops for sorting. The children should have an understanding of the vocabulary prior to the activity. Demonstrate for the children how to use the hoops for sorting the garbage. During the activity talk about the garbage encouraging the children to identify items that would be reused, recycled or disposed of.

Stretch their thinking by discussing how to reduce the amount of garbage that is discarded. For example, children could be asked which items were really not necessary.

Materials which can be reused: jars, bottles, plastic bags...etc.

Materials which can be recycled: aluminum cans, tin cans, plastic bottles, paper... etc.

Materials to be disposed of: plastic packaging, pieces of painted wood, paint cans... etc.

SAFETY PRECAUTION

Make sure that all material is safe to handle.

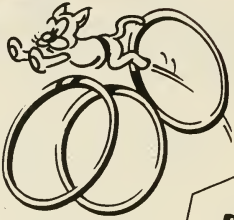
GARBAGE TALK

tag
Teaching About Garbage

What you need

A Garbage Bag

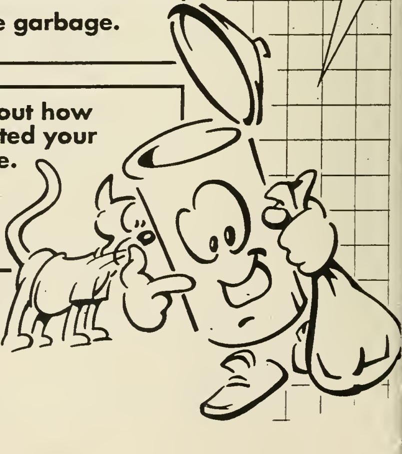
A Friend



3 Sorting Hoops

What to do

1. Choose a garbage bag.
2. Smell it. Touch it.
3. Guess what is inside.
4. Look in the garbage bag and pull out the garbage.
5. Sort the garbage.
6. Talk about how you sorted your garbage.



Can you guess what's in the bag?
A box, some paper, maybe a rag?

GARBAGE TALK

VISUAL ARTS

TELL A STORY

Children create puppets from reusable materials and tell a story about what they used to be and what they are now.

OUT FOR PICK-UP

Children paint garbage day pick-up pictures.

ENVIRONMENTAL STUDIES

WATCH US WORK

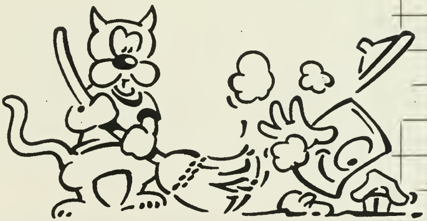
Children observe both the garbage collectors and the truck at work. (Make arrangements with your school custodian.)

PROBLEM SOLVING

WHERE? WHY? HOW? WHAT?

Children respond to problems such as:

What is garbage?
Why was this garbage thrown away?
How is garbage recycled? Reused?
Where does garbage go?
How can we reduce the amount of garbage?



ONE STEP FURTHER

A Class Act

Children plan and carry out a Garbage Brigade Parade demonstrating to the school their involvement in keeping the school yard free of litter.

This idea could spread throughout the entire school with each class assuming the responsibility for monitoring the school yard clean-up.

Litter, Litter, Let's NOT Litter!

ACTIVITY AT A GLANCE

The children will clean up a littered area of the school yard.

ENVIRONMENTAL FOCUS

Litter recognition.

LEARNING OUTCOME

Children will learn that litter not only spoils the appearance of the environment, but that a clean environment is a healthy environment.

BACKGROUND INFORMATION

Garbage left in places where it doesn't belong is usually referred to as litter. Litter can be toffee wrappers dropped in playgrounds; pop cans and drink boxes dropped on sidewalks; fishing line and foamed plastic bait containers discarded in lakes; fast food packaging left in parks; beer bottles and cans thrown from cars; or plastic and paper products blown by the wind from garbage cans and landfills.

Litter can be as small as a bottle cap, as large as an old mattress, refrigerator or car dumped in the countryside, as harmful as barge loads of waste dumped into the ocean, or as dangerous as western countries' hazardous wastes improperly dumped in poor third world countries that are totally unequipped to handle it.

The "throw away" mentality is responsible for littering "our own backyards" and the homes of millions of species of plants and animals. Western countries' toxic litter poses a very serious health threat to hundreds of millions of people in poor countries.

Litter can take anywhere from a few weeks to thousands of years to decompose. A traffic ticket will probably take two to four weeks to degrade, a wool sock one year, a painted wooden stake 13 years, an aluminum can 200-500 years and a glass bottle an undetermined period of time.

Litter, Litter, Let's NOT Litter!

Teaching About Garbage

ACTIVITY CLASSIFICATION

Individual
Whole Group

KEY WORDS

* Litter
Collect
Container
Sort
Protective Gloves

TEACHER TIPS

You could set the environment just prior to the excursion, by asking the caretaker not to clean up the litter in the schoolyard for several days (if this is not possible, go to a nearby park).

Gather up enough collecting containers - one per child.

Encourage children to bring gloves from home. Have extra gloves at school to ensure that each child will have protection.

Six large hoops will make good sorting rings.

Upon returning to the classroom, each child sorts through his or her bag of garbage and uses the rings provided. They could possibly sort up to six different types of discarded waste.

The children may want to give each pile a label:
Paper • Wood • Candy Wrappers • Plastic • Cans •
Food • Other

If the level of comprehension is sophisticated enough, teachers may go one step further by discussing how their found items could have been reduced, reused or recycled.

SAFETY PRECAUTION

You should survey area prior to trip to ensure that there is no broken glass or other dangerous debris. Warn the children that they should use extreme caution in picking up things that may be dangerous.

Litter, Litter, Let's NOT Litter!

What you need

- Lots of litter
- Collecting containers (bags, boxes, a wagon)
- Protective Gloves
- 6 Sorting Rings

HELP!

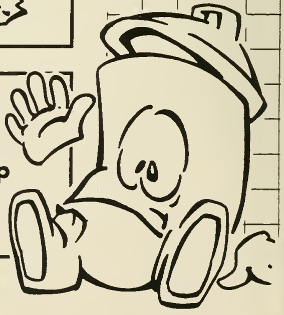
I have a very sad face. Please use your container and clean up this place.

Thank you! I feel much better.

What to do

1. Put on a pair of protective gloves (if necessary).
2. Look around. Find some litter.
3. Collect it in your container and take it to the sorting area in your classroom.
4. Sort the litter. Use the rings.
5. Examine the litter.

6. Talk about: Who made the litter? How can we keep the schoolyard clean?



TIDY UP! THANK YOU.

Litter, Litter, Let's NOT Litter!

LITERATURE

(see Bibliography)

HOW SPIDER STOPPED THE LITTERBUGS
by Robert Kraus

PIGS
by Robert Munsch

GARBAGE DELIGHT
by Dennis Lee

JUST A MESS
by Mercer Mayer

ZEBO AND THE DIRTY PLANET
by Kim Fernandes

MATHEMATICS

MATH GRAPH

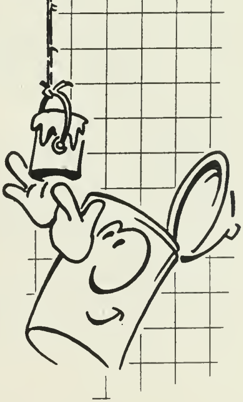
Have the children save some of the litter that was gathered and create a large floor graph showing the different types of litter collected.

WRITING AND VISUAL ARTS

THEN AND NOW

Create a big book with the children by having individual and/or pairs of children draw or paint pictures showing how their efforts changed the appearance of the environment.

Then it was ______ | Now it is ____



Litter, Litter, Let's NOT Litter!

POETRY

Use flannel board for visual stimulation to teach the following poem:

Litter! Litter! All Over The Place

Original Poetry by J. Hendry

When Patti and Ben
And Mylin and Clark
Went off one day to play in the park
They couldn't believe what they saw on the ground
When they opened the gate and looked all around

Chorus
Litter! Litter! All over the place
Litter! Litter! What a disgrace!

When Kami and Paul and Peter and Sue
Went off one day to visit the zoo
They couldn't believe what they saw on the ground
When they purchased their tickets and looked all around

Chorus
Litter! Litter! All over the place
Litter! Litter! What a disgrace!

When George and Heather and Helen and Blake
Went off one day to fish in the lake
They couldn't believe what they saw on the ground
When they put down their bait and looked all around

Chorus
Litter! Litter! All over the place
Litter! Litter! What a disgrace!

When Sarah and Jeff and Omar and Jameez
Went off one day to play in the trees
They couldn't believe what they saw on the ground
When they blinked their eyes and looked all around

Chorus
Litter! Litter! All over the place
Litter! Litter! What a disgrace!

Oh what could these children like Kami and Sue
Oh what? Oh what? Oh what could they do?
To get rid of the litter that was a disgrace,
And help make the world a cleaner place?
They closed their eyes and when their thoughts were clear
They all held hands and began to cheer,

"We'll all get together and lend a hand
To help save our environment, and be proud of our land."

*This poem lends itself to group choral speaking.

ONE STEP FURTHER

Have children create new verses for the poem *"Litter, Litter All Over the Place"* by having them pattern the rhyme and chorus.

POP goes the lid

Teaching About Garbage

ACTIVITY AT A GLANCE

The children pop open 3 garbage cans, and from each choose reusable materials to create something new and useful.

ENVIRONMENTAL FOCUS

Keeping reusable materials out of the garbage.

LEARNING OUTCOME

Children will learn that discarded materials can be reused in many different ways.

BACKGROUND INFORMATION

In the waste management hierarchy, the second most important "R" is reusing.

All kinds of things can be saved and used again — jam jars, yogurt containers, gift wrap, buttons, zippers, elastic bands, plastic bags, wire and string.

Broken bicycles can be repaired, sofas and armchairs can be re-upholstered, torn clothing can be mended, and worn out clothing or cloth diapers can be used for cleaning rags.

The tubes from toilet rolls, plastic wrap or aluminum foil, egg cartons, plastic pop bottles; cardboard frozen juice containers, milk cartons, scraps of fabric, food packets, plastic lids, corrugated cardboard cartons, and the boxes used for packaging cereals, shoes, laundry soap and tissues can all be creatively reused for arts, crafts and science activities in schools.

Finding innovative and imaginative uses for things that would usually be discarded can simultaneously teach the value of reuse as a way of conserving resources and energy, as well as a means of reducing waste by avoiding the purchase of new items and materials.

POP goes the lid

ACTIVITY CLASSIFICATION

Small Group
Individual

KEY WORDS

Garbage Can
* Garbage
* Reuse
Pop
Something
Choose
New

TEACHER TIPS

Make sure that each can is filled with different reusable items. For example:

can 1 with cardboard tubes
can 2 with small boxes
can 3 with popsicle sticks, spools, ribbon
and empty ribbon rings.

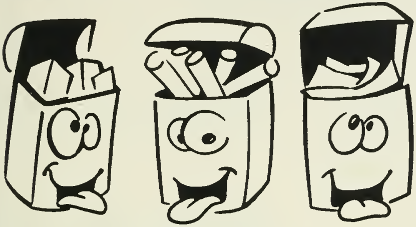
Children should be instructed to make something that is useful. As a general rule activities should not result in more garbage being produced.

If you cannot obtain pop-up garbage cans you could use boxes with lids.

Emphasize that the new item they made will help reduce garbage production since it saved them from buying something new.

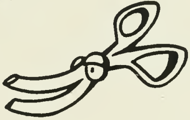
POP goes the lid

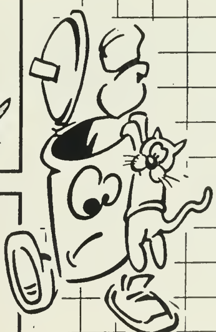
What you need



3 Pop-Up Garbage Cans
(or any other suitable containers)

Tape **String**
Glue **Scissors**




OH DEAR!
These things have been thrown away!
Can you reuse them another way?

What to do

1. Pop the lid of the first can. Choose one thing.
   1=

3. Pop the lid of the third can. Choose three things.
   3=

2. Pop the lid of the second can. Choose two things.
   2=

4. Make something new. Use the scrap box too.

PLEASE TIDY UP. THANK YOU.

POP goes the lid

LITERATURE

(see Bibliography)

JILIAN JIGGS
By Phoebe Gilman

JUNK PILE JENNIFER
By John F. Green

COMMUNICATION

Have the children display and share their creations by demonstrating how they reused their six items.

ENVIRONMENTAL STUDIES

Help the children create a display area (bulletin board or showcase) to show how reusing materials reduces the amount of waste.

ONE STEP FURTHER

The teacher and small group of children create a story chart about their creation made with the items from the three cans.
(Children are encouraged to print if capable).

Example:

Sarah made a machine.
She used:

1 tube, **2** boxes and **3** popsicle sticks

1 + **2** + **3** = **6**

Garbage Gobbler

ACTIVITY AT A GLANCE

Children are asked to feed the garbage gobbler but hopefully they don't feed it what it is asking for!

ENVIRONMENTAL FOCUS

Think before you throw away.

LEARNING OUTCOME

Children will learn that garbage can be reduced, reused and recycled.

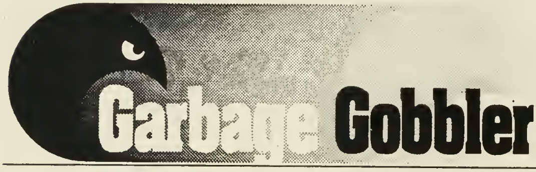
BACKGROUND INFORMATION

In a vast, resource-rich country like Canada, the amount of natural resources available for exploitation seemed endless. Now it is realized that the world's reserves of non-renewable resources such as fossil fuels are dwindling, and that renewable resources such as forests and ground water are being depleted at an alarming rate.

Rethinking our past and present attitudes and habits might well be the most important "R" of all.

By the year 2000, Ontario has mandated that 50% of all household, industrial and commercial waste is to be diverted to productive uses. This will result in many of our garbage trucks being replaced with recycling trucks.

Western countries have been dumping valuable recyclables for decades; but now, depleted resources and the difficulty of finding new landfill space are finally forcing us to rethink. In the not too far distant future, resource extraction from landfills might become a widespread industry.



Garbage Gobbler

ACTIVITY CLASSIFACTION

Small Group
Individual

KEY WORDS

Refuse
* Garbage
* Reuse
* Recycle
* Waste
* Reject

TEACHER TIPS

Make the garbage container talk. Use a cassette tape recorder on which a message from the garbage gobbler has been recorded. Place it either inside the container or nearby and camouflage it if possible. This will certainly motivate the children.

Record a message such as the following:

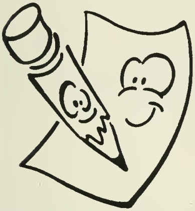
Hello. What's your name?
My name is G.G. That means Garbage Gobbler.
Do you know why I'm called G.G.?
Because I love to eat garbage!
Yummy, Yummy, Yum! I love it!

Do you see that bag over there?
Yes, that's it, the one with all of those yummy boxes and socks and cans and bottles and paper and hangers and popsicle sticks and ...
Oh I'm so hungry!
Please, please, please feed me.

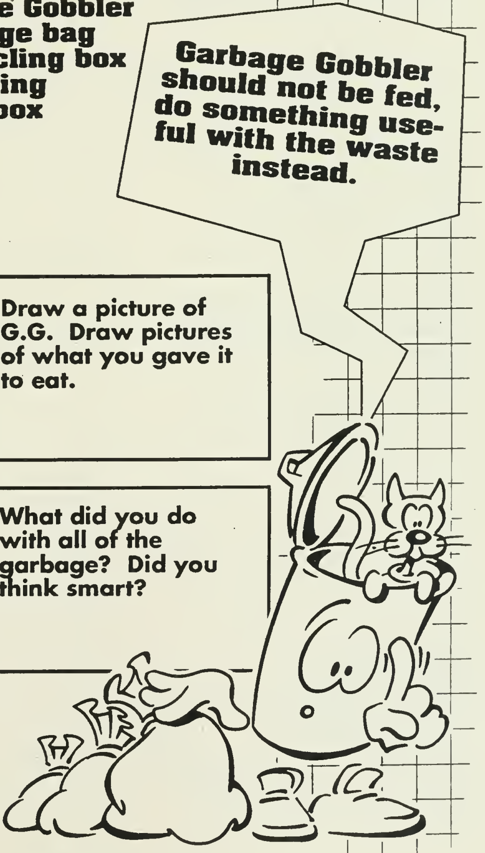
For this activity, a garbage bag should be filled with the items the Garbage Gobbler mentions in the recorded message. Preparation for this activity must include discussion and demonstration of disposable versus both recyclable and reusable materials. Children should only feed the Garbage Gobbler with the truly disposable items, making sure that they are not listening to the Garbage Gobbler's requests, but thinking and selecting very carefully. The less they feed the Gobbler, the better.

Garbage Gobbler

What you need



- The Garbage Gobbler
- A full garbage bag
- A blue recycling box
- Smart thinking
- A reusable box
- Paper
- Crayons
- Pencil


Garbage Gobbler should not be fed, do something useful with the waste instead.

What to do

1. Listen to the very hungry garbage gobbler.

2. Open the bag of garbage.

3. THINK before you feed G.G. Feed it only what you cannot reuse or what cannot be recycled.

4. Draw a picture of G.G. Draw pictures of what you gave it to eat.

5. What did you do with all of the garbage? Did you think smart?

PLEASE TIDY-UP! THANK YOU.

Garbage Gobbler

tag
Teaching About
Garbage

ENVIRONMENTAL STUDIES

WHICH IS MORE?

Children enjoy a walk through the community on garbage pick-up day to observe household bags of garbage and recycling boxes. Along the way children try to discover whether more is being discarded or recycled.

MATHEMATICS

SORT US OUT

Children sort and classify classroom waste throughout one week. Make a giant garbage graph.

WEIGH US

Children estimate and weigh (teacher made) bags of garbage. Record each weight and order the bags from heaviest to lightest.

ONE STEP FURTHER

Children help to illustrate and create a BIG BOOK based on the following poem.

COMMUNICATION

THINK BEFORE THROWING YOUR GARBAGE AWAY, IT MIGHT BE USED ANOTHER WAY.

Children paint pictures to illustrate how garbage may be reused. Each painting has the message: "Think before you throw away" printed on the bottom. Paintings can be assembled to create a BIG BOOK.

POETRY

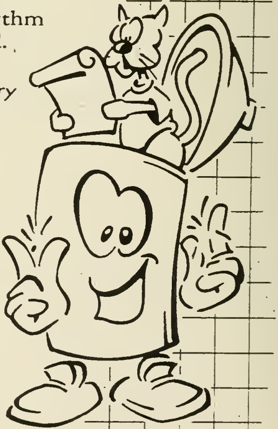
*Children click or snap fingers in rhythm as the book is read.

Pollution Solution

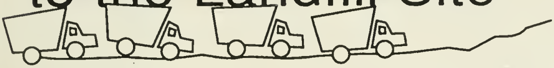
Original Poetry by J. Hendry

"Reduce!" said Goose.
"But how?" said Cow.
"Don't hog!" said Dog.
"That's slick," said Chick.
"Of course," said Horse.
"Big box," said Fox.
"Too big!" said Pig.
"Beware!" said Bear.
"What's that?" said Cat.
"Litter," said Critter.
"How foul!" said Owl.
"Ooooo!" said Ewe.
"What muck!" said Duck.
"I'm cryin'!" said Lion.
"What then?" said Hen.
"Let's load," said Toad.
"Let's go!" said Crow.
"I'll pull!" said Bull.

And off they went so proud of their solution that helped reduce the amount of pollution.



All the Way to the Landfill Site



ACTIVITY AT A GLANCE

Children play in the classroom sandbox and dramatize garbage collection and disposal.

ENVIRONMENTAL FOCUS

Disposal of waste.

LEARNING OUTCOME

Children learn what happens to garbage after it is tossed into the garbage container.

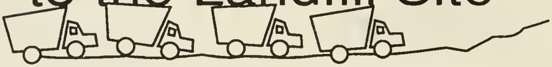
BACKGROUND INFORMATION

We are producing far too much garbage, all of which represents wasted resources and wasted energy. Our first priority is to reduce our waste. Following this, it is possible to reuse or recycle a major percentage of the waste stream. The following table gives the composition of Ontario's waste for the residential sector:

Percentage by weight (1987)	Category	Examples
31.6	Organic	Kitchen and yard wastes
29.2	Paper	Newspapers, fine paper, magazines, telephone books, tissue, etc.
19.5	Packaging	Boxboard, corrugated cardboard, glass, steel, aluminum and plastic containers
11.6	Other	Textiles, leather, rubber, pet litter, ceramics, etc.
2.8	Diapers	
2.5	White goods	Stoves, refrigerators
1.6	Demolition and construction materials	
1.2	Wood	

Our mix of different kinds of garbage sometimes cause serious accidents: garbage trucks have burned and sewers have exploded because people improperly disposed of flammable or reactive wastes.

All the Way to the Landfill Site



BACKGROUND INFORMATION

We can reduce our output of garbage by requiring that all packaging be recyclable and that curbside recycling be mandatory. This is already happening in some countries.

A percentage of household waste is hazardous and this together with miscellaneous non-recyclable waste could be specially collected for disposal. Instead of expensive landfill sites when resources and energy are wasted, we could build facilities in which materials can be processed into new materials.

As of April 1991 almost 2.7 million Ontario households had curbside multi-material blue box collection. 280,000 apartment units in Ontario were served by multi-material recycling programs, an estimated 72% increase over June 1990.

ACTIVITY CLASSIFICATION

Small Group
Individual

KEY WORDS

* Landfill Site
* Recycling Depot
* Blue Box
Garbage Truck
Garbage Disposal

TEACHER TIPS

The children should be familiar with the key words prior to this activity.

Have available many models of garbage trucks, recycling trucks and other toys to encourage true dramatization of garbage collection and disposal.

Involve the children in making mini blue boxes and garbage cans as an art activity to use in the sand box.

All the Way to the Landfill Site

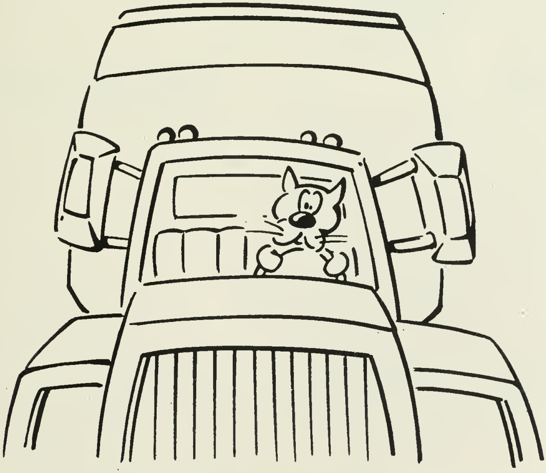
TEACHER TIPS

Provide mini garbage and recyclable items for the children's sand box by collecting miniature items such as pop cans and bottles, play foods (fresh, boxed and canned), plastic bread ties, bottle caps and buttons.

Another way to provide the above-mentioned materials is to cut pictures from magazines and mount them to make them durable for such play.

Check with your local waste management people to find out what items are collected for recycling in your area in order that the play will be realistic.

If you live in a rural area check to see where you can take recyclable materials to be processed.



All the Way to the Landfill Site

Teaching About Garbage

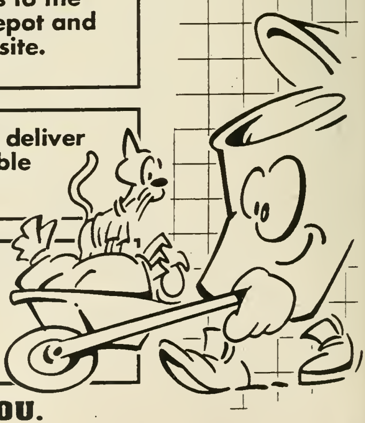
What you need

- **Toy Garbage Trucks**
- **Tractors/Bulldozers**
- **Recycling Trucks**
- **Sandbox**
- **Mini Waste Material**
- **Mini Blue Boxes**
- **Recycling Depot [made from cardboard box]**
- **Toy houses, buildings, cars, people, animals, signs**
- **Landfill Site**

What's that you say? Reducing garbage makes my day. After I've used the blue box just right, I send the rest to the landfill site.

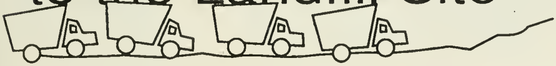
What to do

1. Find a friend to play with.
2. Make a city in the sandbox.
3. Put the garbage cans and blue boxes around the city.
4. Make roads to the recycling depot and the landfill site.
5. Collect and deliver the recyclable material.
6. Collect and deliver the garbage.



DID YOU TIDY UP? THANK YOU.

All the Way to the Landfill Site



LITERATURE

(see Bibliography)

THE GREAT TRASH BASH By Loreen Leedy

TECHNOLOGY

MIGHTY MACHINES

Children learn about garbage trucks. They learn to name parts. They compare the trucks, taking notice of the variety.

ENVIRONMENTAL STUDIES

LET'S GO

The child will enjoy a trip to the truck depot to observe and compare garbage trucks.

LET'S WATCH

On collection day, the class is taken out to observe the pick-up process and operation of the garbage truck.

MATHEMATICS

SORT AND CLARIFY

Children sort and classify waste into two groups:

To Be Recycled
To Be Disposed Of

ONE STEP FURTHER

Trucks At Work

Children are encouraged to paint pictures of garbage trucks and show them at work.

Children are invited to create stories to accompany their paintings.

The teacher can collect creations and make them into a big book.

Teaching About Garbage

ROT or NOT

ACTIVITY AT A GLANCE

Children bury a variety of items to observe biodegradability of waste product.

ENVIRONMENTAL FOCUS

Biodegradability of materials.

LEARNING OUTCOME

Children will learn that some things are biodegradable and that other things are not.

BACKGROUND INFORMATION

Things that can be consumed and broken down into natural substances such as carbon dioxide, nitrogen and water by biological organisms, are biodegradable. The micro-organisms that break down biodegradable materials require warmth, air and moisture. In anaerobic and often too-dry conditions in landfills, biodegradable materials do not readily biodegrade; in fact, still readable 20-year old newspapers and easily-recognized cuts of steak and loaves of bread have been excavated from garbage dumps.

While biodegradability is not equivalent to "environmentally sound", it is preferable to have garbage composed of materials which can biodegrade.

ROT or NOT

ACTIVITY CLASSIFICATION

Individual
Small group
Whole group

KEY WORDS

* Biodegradable
Orange Peel
Garden
Apple Core
Soil
Buttons
Marker
Lettuce Leaves
Plastic
Carrot tops
* Foamed Plastic
Nails
Fabric
Paper Towel

TEACHER TIPS

In preparation for this activity have the children assist by bringing in used flower pots from home. Garage sales are a great source for flower pots!

Near the start of the "planting" children can help by bringing in kitchen and yard waste: vegetable and fruit peelings, coffee grounds and filter, egg shells/decaying leaves, grass clippings.

SAFETY PRECAUTION
Provide protective gloves for added safety.

ROT or NOT

What you need

- Flower Pot
- Soil
- Paper
- Glue
- Popsicle Sticks
- Crayons
- Spoon or Trowel
- Materials for Burying:

plastic, orange peel, apple core, buttons, lettuce leaves, carrot tops, nails, foamed plastic, fabric, foil, paper towel

What to do

1. Choose 1 flower pot.
2. Choose 4 things to bury.
3. Make markers for your items.
4. Put some soil in the pot.
5. Add a little water.
6. Bury your items.
7. Put a marker at each spot.
8. Cover the items with soil.
9. Water your pot gently every second day.
10. After 10 days dig up the items. What has happened?

WILL IT ROT OR WILL IT NOT?
You'll find out when you dig up your pot.

Draw a picture of your buried items. Show them before digging them up and after digging them up.

DID YOU HELP TIDY UP? THANK YOU!

ROT or NOT

LITERATURE

LOTS OF ROT

By Vicky Cobb

MATHEMATICS

CLASSIFICATION

Children classify real materials/ objects and/or picture cards into two groups:
  Biodegradable
  Not Biodegradable

GRAPHING GARDENS

Children dig up their gardens after two weeks of observation and graph the results.

My Garden

Biodegradable	Not Biodegradable

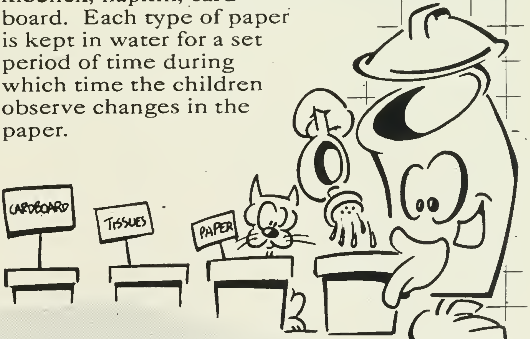
SCIENCE

COMPOSTING

Children begin a class composting project and contribute leaves and household leftovers.

HOW DEGRADABLE IS IT?

Children compare the biodegradability of different types of paper: toilet, towel, newspaper, newsprint, finger paint, kleenex, napkin, cardboard. Each type of paper is kept in water for a set period of time during which time the children observe changes in the paper.



ONE STEP FURTHER

Rot or Not

Children create and write a short play about Rot or Not.

They create puppets or become the characters themselves.

The children involved perform for classmates and other interested audiences.

Planet Protectors To the Rescue.......

ACTIVITY AT A GLANCE

This short operetta is intended to enhance the concept of caring about the environment. Children will come to understand that they too can make a difference and have an impact on others. They must take responsibility for their waste.

ENVIRONMENTAL FOCUS

Clean up your environment.

LEARNING OUTCOME

Children learn that everyone must work together in cleaning up the environment.

BACKGROUND INFORMATION

For decades we have been exploiting the earth's resources and dumping our poisonous wastes into the air, soil and water without much concern for the long term effects on future generations of humans, plants and wildlife.

Children are frequently more aware of environmental issues than adults, and they are psychologically and emotionally having to cope with the unprecedented threat to the survival of the earth as we know it.

They are aware that immediate action is essential otherwise it might soon be too late to save the earth. However, they may not have realized their enormous potential to change things around. Considering that there are about 7 million Canadians aged between 4 and 18, all capable of influencing many millions of adult family members, collectively they represent a powerful force.

Learning about the implications of over-consumption and the resulting output of wastes can help children realize that our attitudes and habits have caused most of the major global environmental problems.

Planet Protectors To the Rescue.......

BACKGROUND INFORMATION

Practising the 3 Rs and encouraging others to do the same is empowering because it is exactly the reverse of planet-damaging behaviour.

In the same way that billions of small negative impacts have added up to global degradation, the sum of billions of small positive actions can make a big difference.

ACTIVITY CLASSIFICATION

Whole Group

KEY WORDS

* Reuse
* Recycle
* Litter
Protector

TEACHER TIPS

Planet Protectors to the Rescue is a one act operetta designed to involve an entire primary class thus giving each individual child an opportunity to participate.

It is felt that the children would enjoy preparing this presentation for a student body as well as parents.

The number of characters will be modified to correspond to different class sizes.

You may want to involve the music teacher in your school to assist with the production.

Planet Protectors To the Rescue.......

SCENERY, PROPS AND COSTUMES

Forest Scene	Painted forest scene as a backdrop with 3-D life-size trees standing on stage.
Animal Costumes	Squirrels, skunks, bears, rabbits, foxes, etc.
Planet Protector Costumes:	Green tights, tops, capes, hoods, washable green make-up, green gloves. Golden stars attached to front of tops.
Golden Stars:	For animals and children - made from felt and each having velcro glued to the back.
Children:	Dressed in play clothes.
3 signs made to stand with the following messages:	Don't Be a Litter Bug Keep the Environment Clean Think Smart, Act Smart
2 large garbage cans each having a painted message:	Put your garbage here!
1 recycle box	
1 box to store reusable items having a painted message:	These things can be reused
Assortments of litter:	Recyclable items [cans, bottles, newspaper] Reusable items [broken toys] Disposable items [candy wrappers, paper]

Planet Protectors
To the Rescue.......

Teaching About Garbage

CHARACTERS

1. Forest Animals (12)
2. Planet Protectors (7)
3. Children (6)

SYNOPSIS

Six young children are carelessly playing in the forest knocking over garbage cans and signs which causes the forest creature's habitat to become unnecessarily polluted.

The animals return to their home and are saddened by the scene they are confronted with. However, the appearance of the Planet Protectors helps to save the day and a valuable lesson is learned by all.

MUSICAL NUMBERS

1. The Litter is Here. The Litter is There.
2. Planet Protectors
3. Planet Protectors
4. The Litter is Here. The Litter is There.
5. Let's Clean Up!
6. Planet Protectors

Original Poetry, Script and Music
by J. Hendry

CURTAIN OPENS

The scene is that of a forest and children playing and littering. Candy wrappers, pop cans, old toys, kitchen wastes and paper are being tossed about. Garbage cans and signs are being knocked over as children run and play.

Children exit while playing tag.

Planet Protectors To the Rescue.......

ENTER FOREST ANIMALS

Enter slowly looking all around shaking heads, rubbing eyes, some sob into their paws.

MUSIC:	*The litter is here, the litter is there* Forest Animals Sing: (slowly and sadly)
	The litter is here, the litter is there, The litter, the litter is everywhere!
	This is our home, it was so green But look at it now, it's a terrible scene!
ANIMAL 1:	What will we do?
ANIMAL 2:	I think we should move!

ENTER QUICKLY FROM BOTH SIDES OF STAGE - PLANET PROTECTORS

PLANET PROTECTORS:	Planet Protectors to the rescue!
ANIMALS:	Who are you?
MUSIC:	*PLANET PROTECTORS*
PLANET PROTECTORS SING:	Planet Protectors that's who we are. You can tell us by our golden star. We travel over land, sea and air. Helping people think and care.
ANIMALS:	Can you help us?
PLANET PROTECTORS:	We'll try!
PLANET PROTECTORS LEADER:	Pick up those cans! Pick up those signs! [Planet Protectors rearrange cans and signs while the animals watch.]
ANIMALS:	But it doesn't look any better!
PLANET PROTECTORS:	Just Wait! We'll be right back!

Planet Protectors To the Rescue.......

PLANET PROTECTOR'S EXIT AND RETURN WITH CHILDREN, BLUE RECYCLE BOX AND BOX FOR REUSABLE ITEMS

CHILDREN: Help! Who are you? Where are you taking us?

MUSIC: *PLANET PROTECTORS*

PLANET PROTECTORS SING:
Planet Protectors that's who we are.
You can tell us by our golden star.
We travel over land, sea and air.
Helping people think and care.

PLANET PROTECTORS: Look around [pointing to the littered ground].

MUSIC: *The litter is here, the litter is there*

ANIMALS SING:
The litter is here, the litter is there,
The litter, the litter is everywhere!
This is our home, it was so green
But look at it now, it's a terrible scene!

CHILDREN: Oh no! What if everyone littered like this!

PLANET PROTECTORS AND ANIMALS: Exactly!

CHILD 1: We understand.

CHILD 2: We're sorry.

CHILD 3: Let's help to clean up.

PLANET PROTECTORS AND ANIMALS: Hooray!

PLANET PROTECTORS: But wait! Let's clean up properly.

Planet Protectors *To the Rescue.......*

CHILDREN & ANIMALS:	What do you mean?
PLANET PROTECTOR'S LEADER:	[Pointing to the ground] Not all of this is disposable garbage.
PLANET PROTECTOR 1:	That's right. Look! Cans can be recycled. So they belong in here. [Puts can into the blue box]
PLANET PROTECTOR 2:	And so can this bottle. [Puts bottle into the blue box]
PLANET PROTECTOR 3:	And so can this newspaper! [Puts newspaper into the blue box]
PLANET PROTECTOR 4:	Look at this truck! It could be fixed and reused.
PLANET PROTECTOR LEADER:	Yes. Put it into this reusable box.
PLANET PROTECTOR 5:	I can fix this bear. [Drops bear into the reusable box]
PLANET PROTECTOR 6:	Now do you understand how to clean up?
CHILDREN:	Yes we do! Some things are recycled and some things are reused.
CHILD 1:	There's hardly any disposable garbage!
PLANET PROTECTOR LEADER:	You've got it! Let's clean up!

Planet Protectors
To the Rescue.......

MUSIC:

LET'S CLEAN UP
[sung by all while cleaning up]

Let's clean up, Let's clean up
And make this place green
And make it once more a beautiful
scene

It just takes some thinking
To find a solution
To keep the environment free
from pollution.

PLANET PROTECTORS:

[To the animals and children]
Now you can be Planet Protectors too.
[pass out stars]
[To the audience - all characters
speak.}
Don't forget. You can help too!

MUSIC:

PLANET PROTECTORS
(Animals, Children and Planet
Protector's sing)

Planet Protectors that's who we are,
you can tell us by our golden star

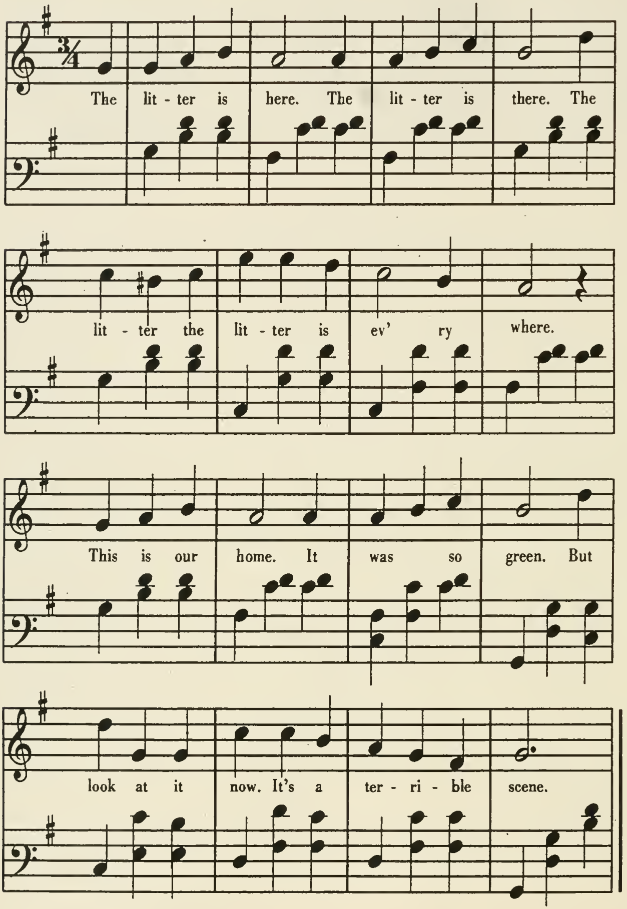
We travel over land, sea and air,
helping people think and care.

Planet Protectors that's what we do,
come and join us! We need you too!
Come and join us!
Wear a star. You can help wherever
you are.

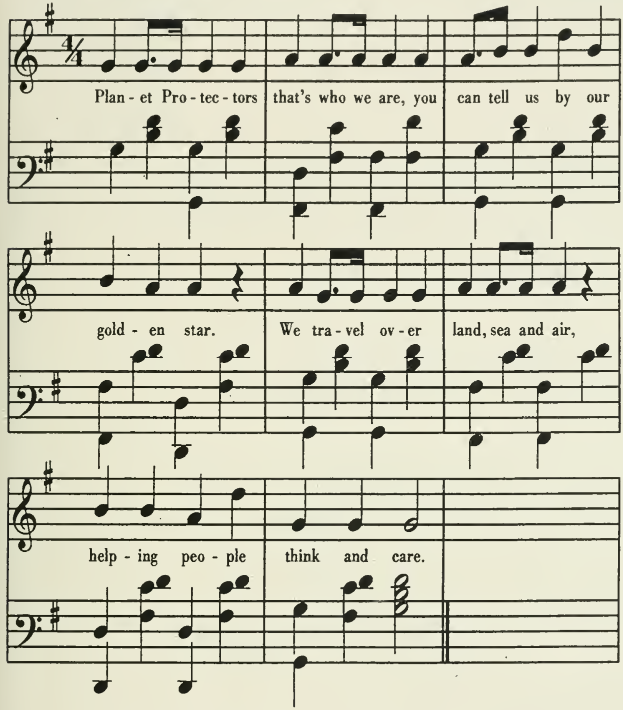
Joan Hendry©

CURTAIN CLOSES

THE LITTER IS HERE

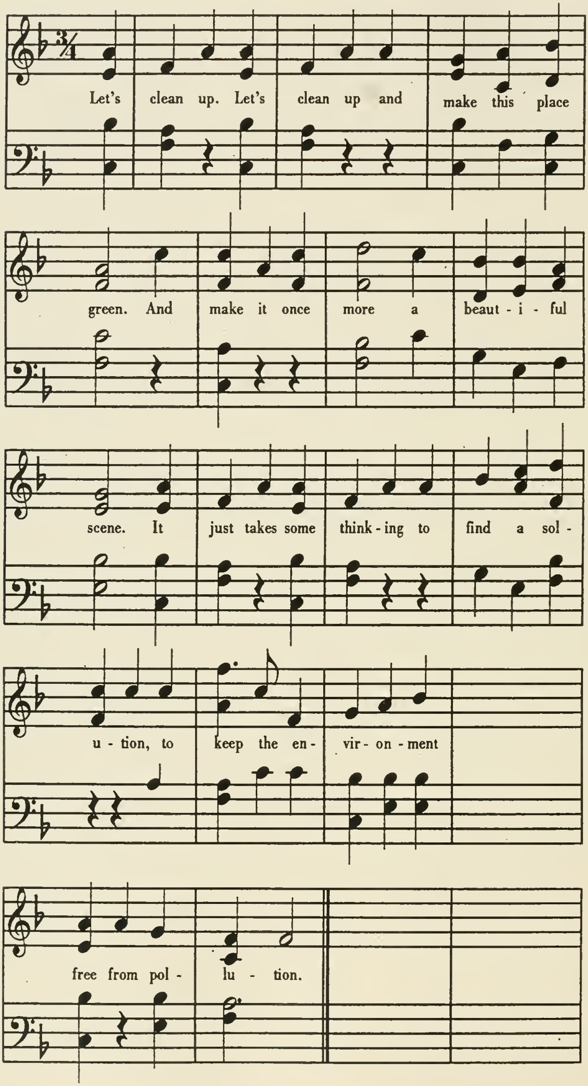

3/4
The lit - ter is here. The lit - ter is there. The
lit - ter the lit - ter is ev' ry where.
This is our home. It was so green. But
look at it now. It's a ter - ri - ble scene.

PLANET PROTECTORS


Plan - et Pro - tec - tors that's who we are, you can tell us by our
gold - en star. We tra - vel ov - er land, sea and air,
help - ing peo - ple think and care.

Planet Protectors that's what we do.
Come and join us we need you too.
Come and join us wear a star
You can help wherever you are!

LET'S CLEAN UP


3/4
Let's clean up. Let's clean up and make this place
green. And make it once more a beaut - i - ful
scene. It just takes some think - ing to find a sol -
u - tion, to keep the en - vir - on - ment
free from pol - lu - tion.

STUDENT ACTIVITIES

LEVEL 2

The bold titles tell the waste management story for each level. The appropriate activity titles are listed below each bold title.

CAN YOU SORT AND CLASSIFY YOUR GARBAGE?

SORT IT OUT

CAN YOU REDUCE YOUR GARBAGE PRODUCTION?

OOPS! IT'S MUCH TOO FULL!
MAILOSAURUS
LUNCH LOOK

CAN YOU DESIGN GARBAGE DISPOSAL MACHINES?

MAGNIFICENT MACHINE

CAN YOU ACT RESPONSIBLY AND CARE FOR THE EARTH?

POLLUTER SNOOPERS
PRECIOUS PETS

sort it out

ACTIVITY AT A GLANCE

Children will sort through discarded waste looking for recyclable and reusable things.

ENVIRONMENTAL FOCUS

Reduce, Reuse, Recycle

LEARNING OUTCOME

Children will learn that reducing, reusing and recycling are important in the fight against pollution.

BACKGROUND INFORMATION

The importance of reducing our wastes to conserve resources and to improve the quality of the earth's air, soil and water and the health of all living things, cannot be over-emphasized.

Our wasteful use and abuse of the world's resources is seriously damaging our life support system. But substantial change is possible. Researchers estimate that over 80% of the solid waste stream could be recovered through intensive recycling.

As of April 1991, nearly 2.7 million Ontario homes in over 450 communities were serviced by a blue box recycling program.

Residential participation rates in blue box communities range from 60-90%.

Nearly half a million homes now have their own composters, and many municipalities have special collections for leaf and other compostable yard wastes.

Metro Toronto has one of the biggest leaf composting operations in North America. Annually, about 7,000 tonnes of leaves are collected for composting.

sort it out

ACTIVITY CLASSIFICATION

Individual
Small Group

KEY WORDS

* Reduce
* Reuse
* Recycle
* Dispose

TEACHER TIPS

Prepare at least six bags of garbage. Make sure that the bags contain materials related to the activity – reusable, recyclable, throw-away and things that did not have to be purchased in the first place.

Provide pre-cut pictures of reusable, recyclable and disposable items for the children. Their task will be to sort through the pictures and select suitable ones for their charts. Provide a "Reuse Us" box or scrap box for reusable items. Obtain a Blue Box for recyclable items. Perhaps the school's Blue Box could be borrowed for a day or cover a cardboard carton with blue paper and label it Room ___'s Blue Box.

sort it out

What you need

- "Reuse Us" box for reusable things
- Blue box for recyclable things
- Garbage can for throw away things
- Chart Paper
- Pictures
- Scissors
- Glue
- Ruler
- Pencil or marker
- Garbage bag

Some folks throw too much away making tonnes of garbage everyday!

What to do

1. Find a friend to work with.
2. Empty out a garbage bag.
3. Sort the garbage three ways: reuse, recycle, dispose.
4. Take a piece of chart paper. Make three columns: reuse, recycle, dispose.
5. Find pictures that match or look like your sorted garbage. Paste them in the correct column.
6. Display your chart.

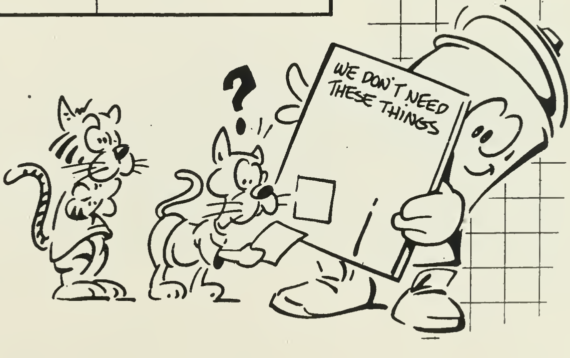
sort it out

Teaching About Garbage

REUSE	**Recycle**	DISPOSE

CHALLENGE

- **REDUCE YOUR GARBAGE.**
- **THINK!**
- **WHAT CAN YOU AND YOUR FRIEND DO WITHOUT?**
- **MAKE ANOTHER CHART. TITLE IT "WE DON'T NEED THESE THINGS."**
- **PASTE OR DRAW PICTURES OF THINGS YOU DON'T NEED.**
- **DID YOU REDUCE YOUR GARBAGE?**


?
WE DON'T NEED THESE THINGS

sort it out

ENVIRONMENTAL STUDIES

OFFICE CHECK

With co-operation of office staff the children gather scrap paper and other materials from school office to reuse and recycle.

VISUAL ARTS

BOXING DAY

Children gather boxes of all shapes and sizes and reuse them to create "super structures." The children can combine their creations and plan to build an environmentally friendly city defending their organizational structure.

MATHEMATICS

SORTING CHALLENGE

(Sorting is a fundamental skill in waste management.) Children are presented with the challenge of sorting a collection of items into only two groups and then into as many groups as possible.

COMMUNICATION

SEND IT TO US

Children write letters to places of work of family or friends asking for discarded materials that may be reused, such as paper, envelopes and boxes. Parents co-operate by delivering the letters and discussing the requests with colleagues.

ONE STEP FURTHER

Class Quilt

Children make a tied quilt from material scraps. Give each child the opportunity to take it home for a night, to share it with their friends and family. Display it on a parent-teacher evening and in the school's showcase window.

OOPS! it's much too full!

ACTIVITY AT A GLANCE

Children observe the piling up of waste in the classroom and provide solutions to the problem.

ENVIRONMENTAL FOCUS

Too much waste!
Not enough room!

LEARNING OUTCOME

Children learn that too much waste creates a serious problem and that in order to help we must reduce, reuse and recycle.

BACKGROUND INFORMATION

The classroom offers a unique opportunity for children to see waste being well managed. If the teacher uses good waste management practices, it may have a profound effect on the children. Paper is most likely the single greatest type of waste generated in the classroom. However, waste from children's lunches, from packaging, from art activities and from the use of teaching materials all contribute to the waste stream in a school.

There are two types of "waste streams," based on source: residential and industrial, commercial and institutional (IC&I). Industrial, commercial and institutional waste makes up about 60% of Ontario's total waste stream. The waste generated by schools in included is the IC&I sector.

OOPS! it's much too full!

Solid Waste Generated by Industrial, Commercial and Institutional (IC&I) Sector (Ontario)

Percentage by weight (1987)	Category	Examples
23.0	Cardboard	
22.0	Other	Textiles, leather, ceramics, rubber, misc. ferrous and plastic products
19.0	Wood	Pallets, misc. wood material
13.0	Paper	Newsprint, fine paper, magazines, telephone books, etc.
10.0	Metal	Steel, aluminum, iron, etc.
5.0	Organic	Food and yard wastes
5.0	Glass	
3.0	Plastic	

ACTIVITY CLASSIFICATION

Small Group
Whole Group

KEY WORDS

- * Reduce
- * Reuse
- * Recycle
- * Garbage Dumpster
- * Waste
- * Landfill

TEACHER TIPS

Explain the purpose of this activity to the school's custodial staff and ask for their co-operation.

Make sure that only dry waste is used for this activity.

Provide one garbage can only for the children's waste. The object is to allow the garbage to pile up throughout the week.

As it fills, make little or no comments about it but continue to add to the pile. Much to their horror they might even observe the teacher throw litter on the floor! The children will notice that the custodial staff are not cleaning up. This will prompt a visit out to the dumpster. This visit should occur when the dumpster is full.

OOPS! it's much too full!

TEACHER TIPS

The children should conclude that the custodial staff has no more room to dispose of the trash.

Ensure that the trash includes things that did not necessarily have to be used, things that can be reused or recycled and things that have to be disposed of.

Send a letter home to parents (see sample letter) explaining the "pile-up" situation in the classroom. Children are bound to tell, therefore you want to ask for parental co-operation.

Dear Parents,

You've probably heard rumours and oh! how they fly, about the garbage in our room that continues to pile high! Believe them because it is true! There is a reason for this.

Our study of environmental issues is focusing on the topic Too Much Waste - Not Enough Room.

The children will come to understand that the disposal of waste is a serious problem and that we can help by reducing, reusing and recycling. At the end of the week the children will be examining "the pile" and sorting through the litter for recyclable and reusable materials. We will also discuss how to reduce the amount of waste by examining packaged items.

Thank you for your interest and support.

Sincerely,

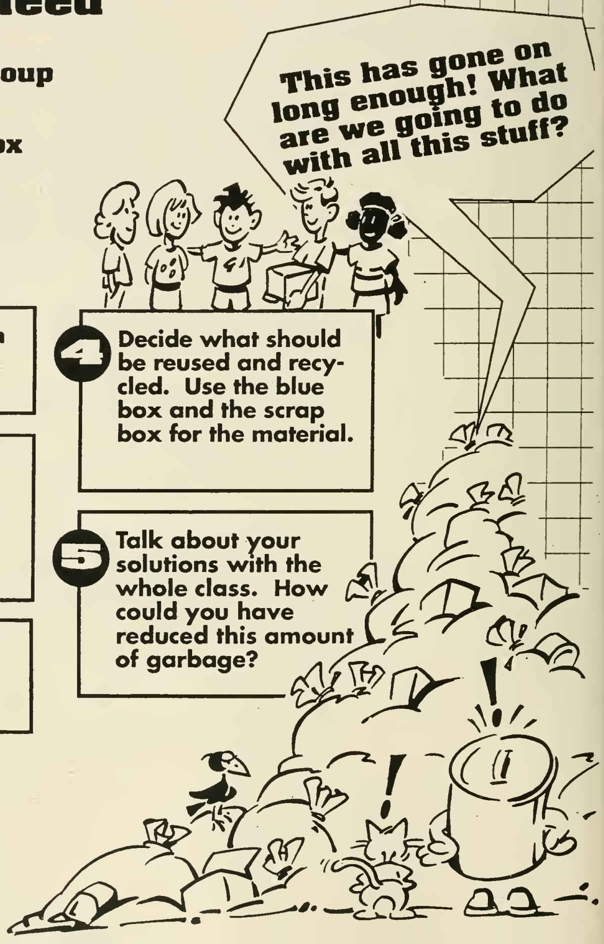
OOPS! it's much too full!

What you need

- A co-operative group of 5 friends
- A container
- Blue recycling box
- Scrap box
- Great Solutions

What to do

1. Visit the dumpster in the school yard.
2. Come back inside and think about what can be done with the waste in your classroom.
3. Tidy up! Help each other and sort through the waste.
4. Decide what should be reused and recycled. Use the blue box and the scrap box for the material.
5. Talk about your solutions with the whole class. How could you have reduced this amount of garbage?


This has gone on long enough! What are we going to do with all this stuff?

OOPS! it's much too full!

LITERATURE

A COLLECTION

With the help of the teacher-librarian, the children make a collection of books both fiction and non-fiction about the topic of garbage.

DRAMA

NO PLACE TO GO!

Children write a short play about litter that was carelessly and thoughtlessly discarded.

VISUAL ARTS

DON'T JUST SAY IT! DO IT!

Children create colourful posters about reducing,reusing and recycling.

COMMUNICATION

I PLEDGE...

Children write a pledge for the week and are recognized for carrying through with it.

ONE STEP FURTHER

No Paper Permitted!

Children plan a paperless day in their classroom by suggesting alternatives to using paper such as slates, computers, tape recorders, tiled letters, paint and vinyl table covering.

MAILOSAURUS

ACTIVITY AT A GLANCE

Children paste junk mail onto a large outline of a dinosaur.

ENVIRONMENTAL FOCUS

Junk mail.

LEARNING OUTCOME

Children learn that junk mail creates an enormous amount of waste.

BACKGROUND INFORMATION

Each year 3 million trees are cut down to send Canadian households a year's supply of junk mail. "Garbologists" excavating old landfill sites have discovered that 80% of junk mail is discarded unopened. This means that 2.4 million trees are cut down unnecessarily each year for junk mail alone.

Newsprint flyers from supermarkets and department stores can be recycled along with newspapers, but addressed junk mail frequently consists of a variety of materials such as non-recyclable glossy paper, fine paper, card stock, eye-catching plastic-coated foil, a return mailing envelope, gummed stickers, "scratch and win" cards.

If junk mail consisted of either all newsprint or all fine paper and came without plastic window envelopes, it could simply be placed – open or unopened – in the appropriate recycling bin.

Although this option would still waste considerable numbers of trees, at least the paper could be recycled thus keeping some of our forests out of landfill sites.

MAILOSAURUS

ACTIVITY CLASSIFICATION

Whole Group
Individual

KEY WORDS

Junk Mail
* Pollution
* Waste
* Reuse
* Recycle

TEACHER TIPS

Creating a large outline of a dinosaur with the children will give them an understanding of the enormity of the junk mail problem.

Roll out mural paper along the floor and have the children attempt to hold hands around the size of the piece of paper needed to draw the dinosaur. Is the group large enough to do so? Does every child fit around the paper? Are arms stretched to the limit? (Instead of mural paper you could use newspapers taped together.)

This exercise will also stimulate discussion about size. The children may offer further examples of enormous creatures such as elephants and whales.

Ask the children to bring in any junk mail that is delivered to their homes. Save it until enough has been collected to cover the dinosaur.

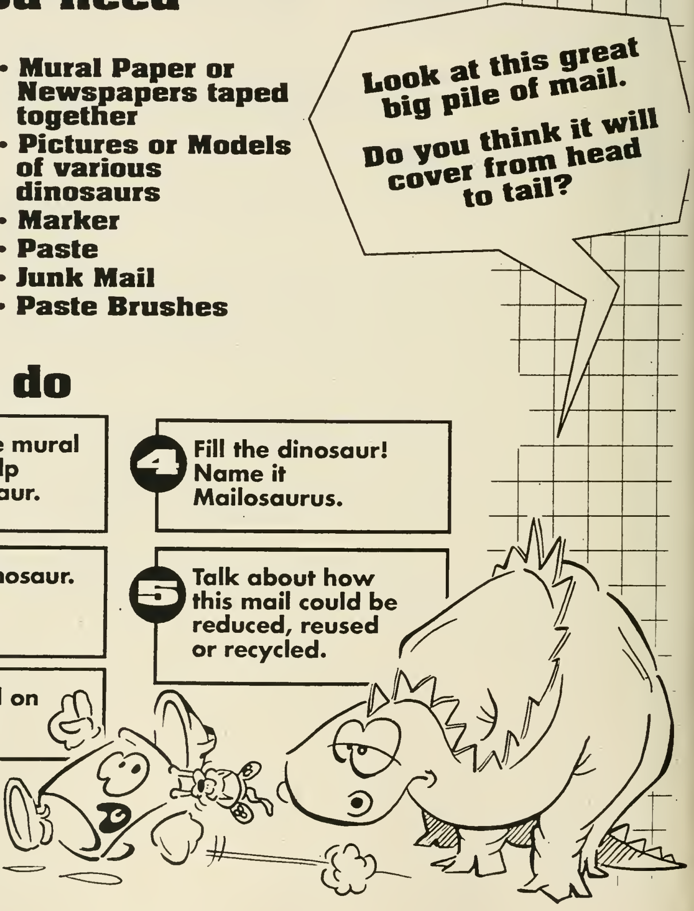
Once the dinosaur is mounted, the children and others in the school continue to paste on the junk. Watch it fatten and become very life-like!

Name it Mailosaurus!

MAILOSAURUS

What you need

- Mural Paper or Newspapers taped together
- Pictures or Models of various dinosaurs
- Marker
- Paste
- Junk Mail
- Paste Brushes


Look at this great big pile of mail.
Do you think it will cover from head to tail?

What to do

1. Sit around the mural paper and help draw a dinosaur.
2. Cut out the dinosaur.
3. Paste the mail on the dinosaur.
4. Fill the dinosaur! Name it Mailosaurus.
5. Talk about how this mail could be reduced, reused or recycled.

MAILOSAURUS

THE ARTS

JUNK MAIL DINOSAUR

Children make a paper dinosaur pattern, pin it onto scrap material, cut it out and sew it up leaving an opening large enough for stuffing. Stuff the dinosaur with junk mail. Sew up the opening and hang the dinosaur throughout the classroom.

JUNK MAIL PAPIER MACHÉ CREATURES

Have the children tear junk mail into strips and use to create papier maché creatures. Paint or decorate with reusable items.

JUNK MAIL COLLAGE

Children create colourful collages using junk mail.

ALL THE COLOURS OF THE RAINBOW

Children cut out colours from junk mail flyers and fill in patterns and designs.

MATHEMATICS

MASSIVE MAILOSAURUS

Bring a set of bathroom scales to school and place them around the junk-filled dinosaur. The children weigh themselves first. Teacher records total mass of the group. The children pick up the dinosaur and carefully step onto scales once again. Teacher records total mass of the children and the dinosaur. Children compare the differences.

ONE STEP FURTHER

Where Does All the Junk Come From?

Children group and classify junk mail and make a list of all the different sources of junk mail. Teachers should invite suggestions about ways in which junk mail could be reduced.

LUNCH LOOK

ACTIVITY AT A GLANCE

The children examine their lunches for wrappings and consider alternative ways to pack lunches.

ENVIRONMENTAL FOCUS

Unnecessary packaging.

LEARNING OUTCOME

The children learn to pack garbage-free lunches.

BACKGROUND INFORMATION

Many food products are over-packaged or unnecessarily packaged, and individually wrapped single servings are particularly wasteful.

Looking at various kinds of reusable, recyclable and biodegradable packaging and separating it from non-reusable, non-recyclable and non-biodegradable wrappings and containers can help children understand how we generate so much waste.

Multi-layered, multi-material containers such as those used in drink boxes are almost impossible to recycle as the various layers cannot be separated for recycling back into the original product.

Five billion drink boxes are thrown away each year in North America. Refillable bottles and thermos containers can solve this waste disposal problem.

Examining materials used in packaging together with the environmental impact of their manufacture, use and disposal, can provide reasons for packing garbage-free lunches.

LUNCH LOOK

Teaching About Garbage

ACTIVITY CLASSIFICATION

Individual

KEY WORDS

* Packaging
* Pollution
* Waste
Disposal
Garbage Free
* Reusable
Bulk Food

TEACHER TIPS

Children should be praised for attempting to make changes with regard to packing lunch. The children who do indeed find alternative solutions to paper wrapping and juice boxes, for example, should be encouraged to share their "new ways" with their peers.

If an entire class participates in this activity the teacher could provide a popcorn treat as a special surprise.

Have counters available for this activity: bingo chips, bread ties, chicken rings, buttons, etc.

Prior to this activity, the teacher may wish to discuss garbage-full versus garbage-free lunches.

The teacher can pack two different lunch boxes and have them on hand to stimulate discussion, questions and problem solving;

OR

Have a series of pictures available that show lunches packaged in a variety of ways: sandwiches wrapped in foil, waxed paper, handi-wrap or reusable plastic containers; bottled drinks, canned drinks, juice boxes, juice in a reusable container such as a plastic jar or thermos bottle; whole fruit, fruit cups, wrapped pieces of fruit; wrapped candy, chocolate bars, plastic wrapped cookies;

OR

LUNCH LOOK

TEACHER TIPS (cont'd)

Have available real foods packaged in a variety of ways: paper, plastic reusable containers, foil, foamed plastic wrapping.

1. The children sort pictures of food products according to the amount of packaging, verbalizing their reasoning for choosing their ordering pattern.
2. The children sort pictures and food products into groups such as: over-packaging, moderate packaging, environmentally friendly packaging; OR reusable, recyclable, or disposable packaging.
3. Have available reusable containers at school for the children's use in the classroom. These are usually readily available at garage sales or from parents, relatives and friends who are interested and supportive of the project.

Plan a "Make, Pack & Eat" lunch day at school.

The children will help to plan and obtain the necessary ingredients for sandwiches, fruit and drinks. Early in the day, the children make and pack a school-made garbage-free lunch. This active participation will encourage and invite much discussion regarding good packaging and reducing the amount of garbage. At lunch time the children will again admire their handiwork as well as enjoy their self-made lunches.

Tidying up should be a joy! No garbage!

* Collection of peelings and cores from fruit could lead to a study of composting

The children should come to understand the value of garbage-free lunches. Encourage and praise changes in the children's efforts to work towards garbage-free lunches. Not all children may succeed due to economic situations or the degree of parental support. The teacher should be aware of home environments of all children and as a result use discretion in the amount of change expected from each group of children.

LUNCH LOOK

Teaching About Garbage

What you need

- **Your Lunch**
- **10 Counters***

*Bingo Chips, Buttons, Spools.

Look for garbage in your lunch.

Do you have a bit or a great big bunch?

What to do

1. Count out 10 counters.
2. Spread your lunch out on your desk or on a table.
3. Place a counter on top of things that you think will be garbage.
4. How many counters do you have left? Ten? Yippee! Super Duper! Fantastic!

   Less than ten? What can you do to make your lunch more garbage-free?
5. Try this activity again tomorrow. See if you can pack a more garbage-free lunch.

LUNCH LOOK

MATHEMATICS

HOW GARBAGE-FREE ARE MY FRIENDS?

Children design a graph to show the habits of five friends.

For example:

- Do you eat at fast food restaurants?
- Do you use a blue box?
- Do you pack garbage-free lunches?
- Do you use both sides of paper?
- Do you buy bulk food?

MATCH IT UP

Teacher provides picture cards of food and materials that the children identify and match to the appropriate disposal method: Reduce, Reuse, Recycle, Compost, Dispose.

ONE STEP FURTHER

Popcorn Pennies

Children organize a pollution-free popcorn party to raise money for the Wildlife Fund or Adopt-a-Tree Programme.

MUSIC

Garbage - “Canada is Music 1-2”
Gordon V. Thompson Music
Toronto, 1988
Pg. 71

ENVIRONMENTAL STUDIES

HOUSE HABITS

Children observe wasteful habits within their own home and make a list of these habits that could be changed.

SCIENCE/ TECHNOLOGY

FEED THE BIRDS

Children make bird-feeders out of packaging that may have been otherwise discarded.

Such as: Milk cartons, pop bottles, net bags, foil pie plates, foamed plastic trays.

Magnificent Machine

ACTIVITY AT A GLANCE

The children collect pictures and books about garbage trucks learning to identify and name truck parts and understanding the importance of garbage trucks to the community.

ENVIRONMENTAL FOCUS

Waste disposal.

LEARNING OUTCOME

The children will learn about garbage trucks and the role they play in the disposal of waste.

BACKGROUND INFORMATION

Separating garbage into different categories such as general household refuse, recyclables, compostables and hazardous waste has required designing special-purpose garbage collection vehicles, handling and storage equipment, and reprocessing facilities, all of which require energy to be built and to operate.

Garbage trucks use a lot of energy. Stop-and-go traffic causes 11% of all air pollution from vehicles, and garbage trucks spend their working lives stopping and starting. As landfills fill up more dumps must be found, and new sites are now located far from the cities where the majority of people live.

Transporting garbage over increasing distances is time and energy consuming, which adds to waste disposal costs.

Waste disposal vehicles are heavy and cause damage to road surfaces, which is another cost factor of waste disposal to be considered. A recycling truck weighs 13,000 kg, but a garbage truck weighs 3,000 kg more due to the additional weight of the compactor.

Normally, a garbage truck will hold the waste from 500 homes. The average load of waste weighs 11,000 kg.

Magnificent Machine

ACTIVITY CLASSIFICATION

Small Group
Individual

KEY WORDS

Garbage Truck
Hopper
Hydraulic Shaft
Forks
Lever
Dumpster
Cab
Controls
Roll-off Boxes
Packer
Compact Press
Hooks
Recycling Truck

TEACHER TIPS

Collect picture books, pictures and models (if available) of as many garbage trucks as possible. Children will be able to help with the collection, teacher-librarians also are always good resource personnel.

Make a collection of boxes and cardboard tubes of various sizes as well as circular items that will work as wheels for model trucks that the children will create.

Prepare word cards and bundle them in sets to allow for both individual and small group participation. Use words from the "Key Words" list. Prior to this activity plan for the children to observe a garbage truck at work.

If you cannot find the pictures or models, have the students observe the garbage truck and recycling truck when they come to the school. Take a picture for the class if a camera is available.

Magnificent Machine

What you need

- Picture books, pictures or models of garbage trucks
- Set of Word Cards
- Reusable materials
- Glue
- Scissors
- A great imagination!

Some are red and some are green.

What colour will you make your magnificient machine?

What to do

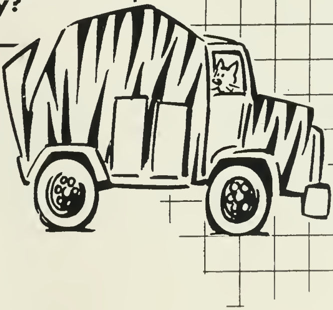
1 Examine the pictures or models of garbage trucks.

2 Identify and name the parts of the truck. Use the word cards to help you.

3 Look in the "reuse us" box. Find materials to make a magnificient machine.

4 Tell your friends how you made it and how it works.

5 How will your machine help a community?



Magnificent Machine

LITERATURE

CURIOUS GEORGE AND THE DUMP TRUCK

By Margaret Reys

MEDIA

LOAD IT!

Teacher and students set up the video camera where they can film the garbage truck at work on the school property.

COMMUNICATIONS

TRUCK TALK

Students can use the video to write about the garbage truck.

MATHEMATICS

LET'S COMPARE

The students compare the various types of garbage trucks and chart similarities and differences.

Extend this discussion by examining the contribution of garbage trucks to the community. How much garbage do they hold?

VISUAL ARTS

MAGNIFICENT MACHINES

Children paint pictures of garbage trucks and/or recycling trucks at work. Children can be encouraged to write stories about their magnificent machines at work to show how truly "magnificent" they are and how they are so necessary to each community.

RESEARCH

GARBAGE COLLECTORS

Children read about and prepare posters about garbage collectors.

ENVIRONMENTAL STUDIES

A SPECIAL VISITOR

Teacher and children invite a garbage collector in to talk about his/her job.

ONE STEP FURTHER

Dear Garbage Collector

Children read a book on garbage collection and then write letters to waste reduction and disposal service companies expressing their thanks for a job well done.

Polluter Snooper

ACTIVITY AT A GLANCE

Children will snoop around the playground looking for polluters.

ENVIRONMENTAL FOCUS

Environmental pollution.

LEARNING OUTCOME

Children will learn to encourage their peers to stop polluting.

BACKGROUND INFORMATION

Playgrounds are good places to spot litterbugs, and the polluter snooper patrol can track down all kinds of other environmental offences, some of which may not be immediately obvious. For example, mistreating toys, clothing, lunch boxes and knapsacks causes pollution because carelessly handled articles soon become broken or worn out and have to be replaced. Taking care of things means they will not become garbage so soon.

Harming trees and other vegetation indirectly creates pollution because plants weakened by acts of destruction have a reduced capacity for filtering pollutants from the atmosphere..

Cars left idling cause 11% of all vehicle emissions so tickets can be issued to smog-producing parents, teachers and bus drivers who fail to turn off the ignition while waiting.

ACTIVITY CLASSIFICATION

Individual
Whole Group

KEY WORDS

* Pollution
Polluter
Snooper
Binoculars
Tickets

Polluter Snooper

TEACHER TIPS

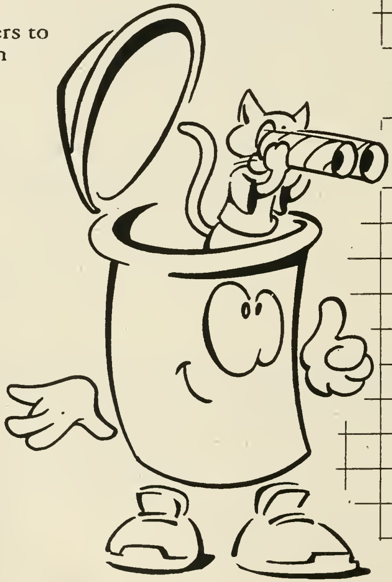
Collect toilet paper rolls which make great snooper binoculars or egg cartons which make eye glasses.

Design and create green tickets with the children prior to this activity, five per child.

Discuss with the children the criteria for passing out green tickets: candy wrappers thrown on ground, peelings littered on ground, chip or popcorn bags on the ground, etc. Prepare the children for possible reactions from the polluters. Children should check the area later to see that their tickets have not become litter.

Spreading the word to other staff members about the polluter snoopers will assist in a positive learning experience for all children.

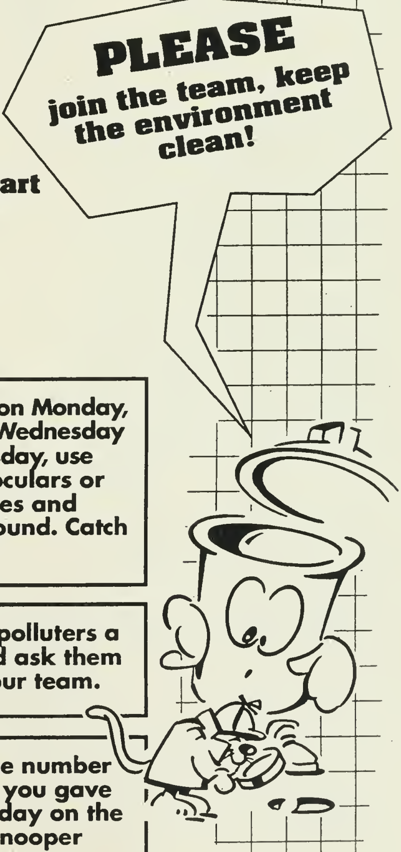
Encourage the polluter snoopers to praise and thank other children for not polluting.



Polluter Snooper

What you need

- 1 Pair of polluter snooper binoculars or eye glasses
- 5 Green polluter snooper tickets
- Polluter snooper chart
- Reusable materials
- Glue
- String
- Markers


PLEASE
join the team, keep the environment clean!

What to do

1. Make yourself a pair of polluter snooper binoculars or a pair of polluter snooper eye glasses. Use reusable material to make them.
2. Count out 5 polluter snooper tickets. Keep them.
3. At recess on Monday, Tuesday, Wednesday and Thursday, use your binoculars or eye glasses and snoop around. Catch polluters.
4. Give the polluters a ticket and ask them to join your team.
5. Record the number of tickets you gave out each day on the polluter snooper chart.

Polluter Snooper

6 Record the class total each day.

7 On Friday talk about the polluter snooper activity. Do polluter snoopers help to fight pollution? Is the plan working? Will we continue to snoop?

MONDAY

Class Total ____________

TUESDAY

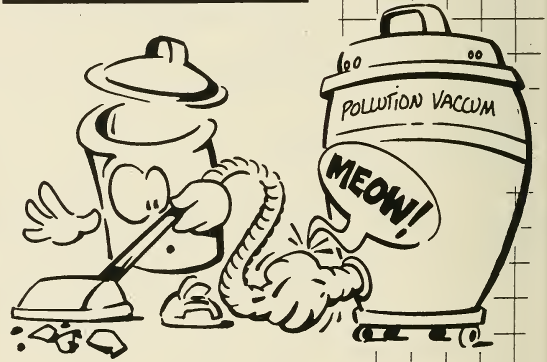
Class Total ____________

WEDNESDAY

Class Total ____________

THURSDAY

Class Total ____________



What kind of pollution was found?

Polluter Snooper

ENVIRONMENTAL STUDIES

WHAT'S GOOD?

Children take a walk through the community looking for good things:
A clean park, garbage cans, clean streets and sidewalks, clean playgrounds.

VISUAL ARTS

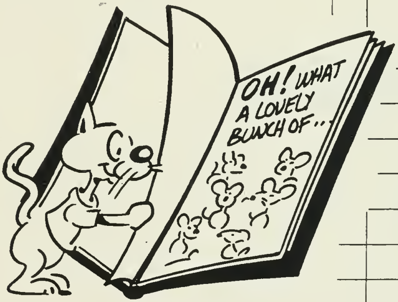
CLEAN & GREEN

Children create a mural of the good things that they observed on their walk through the community.

COMMUNICATION

OH WHAT A LOVELY BUNCH OF TREES!

Children create a BIG BOOK of lovely scenes. Each page reads: Oh what a lovely bunch of ...


OH! WHAT A LOVELY BUNCH OF..

ONE STEP FURTHER

Fix Me Up

Children collect old, used and broken toys and with the help of parents and volunteers fix them up and donate them to a local hospital, a family distress centre or another charity.

PRECIOUS PETS

tag
Teaching About
Garbage

ACTIVITY AT A GLANCE

Children create precious pets out of blown egg shells and learn the responsibility of caring for something so fragile.

ENVIRONMENTAL FOCUS

Stewardship of the earth.

LEARNING OUTCOME

The children will learn that the earth is a fragile planet requiring responsible and caring individuals to save it from destruction.

BACKGROUND INFORMATION

If the earth were only a few feet in diameter and floating a few feet above a field somewhere, people would come from everywhere to marvel at it. People would walk around it, marvelling at its pools of water, its little pools and the water flowing between the pools. People would marvel at the bumps on it, and the holes in it, and they would marvel at the very thin layer of gas surrounding it and the water suspended in the gas. The people would marvel at all the creatures walking around the surface of the ball, and at the creatures in the water. The people would declare it as sacred because it was the only one, and they would protect it so that it would not be hurt. The ball would be the greatest wonder known, and people would come to pray to it, to be healed, to gain knowledge, to know beauty and to wonder how it could be. People would love it, and defend it with their lives because they would somehow know that their lives, their own roundness, could be nothing without it. If the earth were only a few feet in diameter.

PRECIOUS PETS

Teaching About Garbage

ACTIVITY CLASSIFICATION

Individual

KEY WORDS

Responsibility
Fragile
Destroy
* Pollution

TEACHER TIPS

Handle the topic of destruction delicately with young children as they could become scared and uncertain about their immediate environment. Emphasize the cumulative effect of many people doing "their part" to save the earth.

Discuss also the effect of sharing and helping each other to care.

Prior to this activity purchase eggs to have a few extra on hand. Ask the children to bring in blown eggs from home. Talk about how fragile eggs are and that they will require great care on the way to school. A blown egg is made by poking a hole in each end of a raw egg with a needle. Blow through one to remove the white and the yolk.

Discuss the fact that it will be the responsibility of each child to care for the egg and later, the precious pet. Emphasize the fragility of the egg and relate this concept to the earth and the responsibility of children and adults towards its survival.

Points to discuss:

1. Reducing the amount of garbage.
2. Cutting down too many trees.
3. Recycling materials.
4. Reusing items - repairing, trading, exchanging.
5. Walking and riding bicycles as much as possible.

PRECIOUS PETS

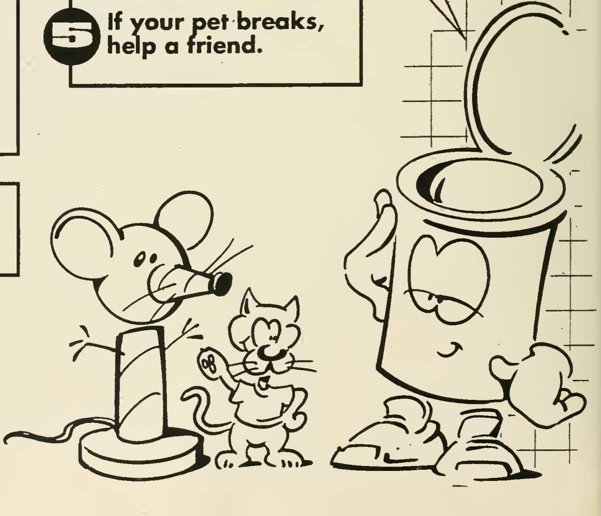
Teaching About Garbage

What you need

- 1 Blown egg
- Paint
- Brush
- Paper scraps
- Scissors
- Glue
- Plasticine

What to do

1. Be very careful!
2. Design your precious pet. Give it eyes, ears, a nose, a mouth, hair and a name.
3. Make a plasticine base for your pet.
4. Take care of your pet all day.
5. If your pet breaks, help a friend.


Precious pets are fun to make but just like the earth they can break!

PRECIOUS PETS

MUSIC

It's a Wonderful World - GLC

Silver Burdett Publishers

1986, Agincourt, Ontario

COMMUNICATION

MY RESPONSIBILITIES

Children create small booklets (one of each) about personal responsibilities at home such as:

Make My Bed
Brush My Teeth
Set The Table
Sort Garbage
Take A Bath
Clean My Room
Care For My Pet

HELPING HANDS AT SCHOOL

Children assume responsibility for classroom tasks.

PHYSICAL EDUCATION

CO-OPERATIVE GAMES

Children play a number of co-operative games to discover success by helping each other.

TOGETHER WE'LL WIN

The teacher sets problem solving situations that force the physical co-operation of children.

BALL TOSS

Using a Mad Ball children learn how to delicately catch and throw it. This is available through Wintergreen. It is an electronic ball which, if not caught gently, makes a sound of breaking glass.

- Wintergreen
Communications Ltd.
519 North Rivermead Road
Concord, Ontario
L4K 3N1

1-800-268-1266
Cost: approximately
$25.00

ONE STEP FURTHER

I Care. I Will Help.

Children create a BIG BOOK about things they care about in the environment and how they will help.

For example: I care about trees.
I will help by ...

STUDENT ACTIVITIES

LEVEL 3

The bold titles tell the waste management story for each level. The appropriate activity titles are listed below each bold title.

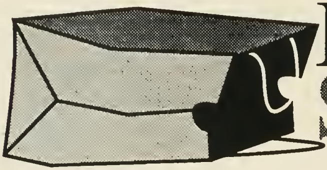
THE GARBAGE STORY

REDUCING
PROPER SHOPPER
HORRIBLE HAZARDS
GREENER CLEANERS

REUSING
THE GREAT EXCHANGE

RECYCLING
PAPER PULP PAPER
WORMY WONDERS

DISPOSING
WHAT'S BURIED HERE?



Proper Shopper

ACTIVITY AT A GLANCE

The children will observe the shopping habits of an adult while accompanying him/her on a trip to the grocery store.

ENVIRONMENTAL FOCUS

Excess packaging.

LEARNING OUTCOME

The children will learn to recognize the wise shopper and one who expresses concern about over-packaged items.

BACKGROUND INFORMATION

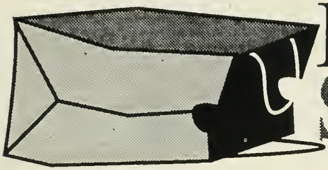
The production, use and disposal of the materials we use for packaging contribute to many environmental problems including acid rain, resource depletion, water pollution, litter, waste disposal and ozone destruction.

One out of every ten dollars spent on groceries pays for the cost of packaging them. 55 million plastic grocery bags are thrown away in Canada every week. Most of these could be reused, thus reducing waste.

In addition to the costs of packaging, the cost of disposing of it is borne by municipal taxpayers. There are so many products crowding the supermarket shelves that companies have to compete with one another to make their packages ever brighter, glossier, bigger and more appealing to consumers.

Consumers can have a say in packaging. If we all refused to buy wasteful, excessively packaged products, companies would be forced to change.

Arranging a supermarket tour for the purpose of seeking out over-packaged products can help consumers decide which items to choose and which to refuse.



Proper Shopper

ACTIVITY CLASSIFICATION

Small Group

KEY WORDS

- * Bulk products
- * Packaging
- Paper
- Plastic
- Carton
- * Foamed Plastics
- Cardboard
- Fresh
- Frozen
- Packaging

TEACHER TIPS

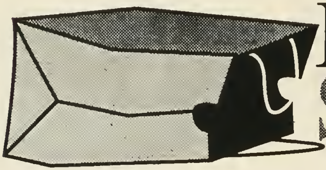
Arrange for five very willing friends to each take a small group of children on a trip to the grocery store.

With these five volunteers plan a shopping list of six items: flour, coffee, milk, eggs, juice, bread.

Attempt to arrange for funding for the suggested groceries. The shoppers could keep the groceries after the activity is completed. Each shopper should be asked to spend twenty dollars.

Give the adults no further information. Their main task is to shop for the items on the shopping list.

In discussing the use of plastic or paper, children should be made aware that there are arguments for and against both options. Plastic bags are light and strong but they use up fossil fuel resources and do not decompose quickly. They can be reused a number of times. Paper bags use up forests, they take up much more space than plastic ones but they do decompose fairly quickly in proper conditions. Fabric material bags are both strong and reusable! Reusing packaging or bags is one major step to reducing our use of resources. Refusing to purchase over-packaged items is also a way to bring concern to the company.



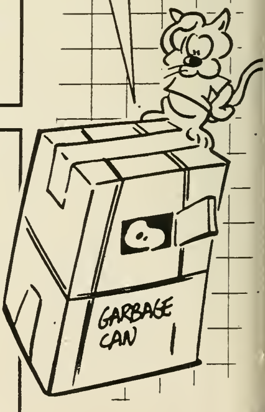
Proper Shopper

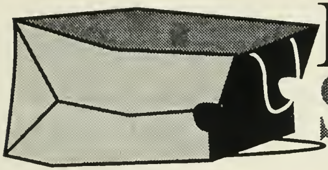
What you need

- A proper shopper survey sheet
- A pencil
- Clipboard
- A shopper
- Four other friends

What to do

1. Accompany your shopper to the grocery store.
2. Follow the shopper around and as the shopper buys the food check your survey sheet.
3. Once you have returned to the classroom complete the survey sheet and then gather with your teacher, the shoppers and other classmates to discuss your survey.
4. After the discussion invite the shopper to join your small group again.
Make a chart about
TIPS FOR THE PROPER SHOPPER
or
HOW TO REDUCE OUR WASTE.


When you go to the store to buy, we must think and really try to not buy things in wrappings tight that might end up at the landfill site.
GARBAGE CAN



Proper Shopper

PROPER SHOPPER SURVEY SHEET

PUT CIRCLES AROUND THE CORRECT ANSWERS.

Did the shopper buy bulk flour?	Yes	No
If the answer is no, how was the flour packaged	plastic	paper
Did the shopper buy milk in plastic bags?	Yes	No
If the answer is no, how was the milk packaged?	reusable jug	carton
Did the shopper buy eggs in a foamed plastic container	Yes	No
If the answer is no, how were the eggs packaged?	recycled cardboard	plastic
Did the shopper buy fresh juice?	Yes	No
If the answer is no, how was the juice packaged?	reusable bottle	frozen in a can
Did the shopper grind fresh coffee beans?	Yes	No
If the answer is no, how was the coffee packaged?	Recyclable can	foil
Did the shopper buy bread?	Yes	No
How was the purchased bread packaged?	plastic	paper
Did the shopper spend more than $20.00	Yes	No
Did the shopper have a personal shopping bag?	Yes	No
If the answer is no, what kind of bags were used at the check-out?	plastic	paper

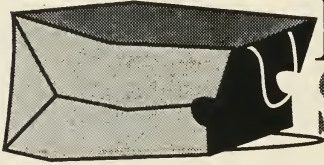
OTHER COMMENTS ABOUT THE SHOPPER

Rate the shopper

A proper shopper ______ Pretty good ______ Could improve ______

PLEASE SIGN HERE

SHOPPER____________ SURVEY TEAM____________



Proper Shopper

VISUAL ARTS

SO MUCH WRAP!

Using pictures of products advertised in papers and flyers the children create an interesting collage about over-packaging.

SO MANY WAYS!

Children choose one product such as: bread, milk, cheese, cookies, pasta or desserts. They search through papers, magazines and flyers to find as many different ways as they can, that show how the product they have chosen can be packaged. Paste the pictures on to poster paper and mount.

COMMUNICATION

PROPER SHOPPER SHOPPING LISTS

Children create shopping lists attempting to show how to buy, using the least amount of packaging.

LET'S HAVE A LOOK AT LUNCHES

Children examine their lunches to discover if they have too much packaging. Children discuss ways to reduce the amount of packaging in lunches. Children plan garbageless lunches.

ONE STEP FURTHER

Buy my product!

Children design and advertise a packaging product. They attempt to sell it to their peers. They should give reasons for the design and type of packaging/materials used, whether the product is biodegradable or not, the life span of the product and special features.

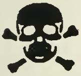
Horrible Hazards

Teaching About Garbage

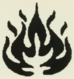
ACTIVITY AT A GLANCE

The children will examine and identify hazardous cleaners and sort them according to the universal symbols:

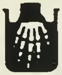
Toxic



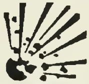
Flammable



Corrosive



Explosive



ENVIRONMENTAL FOCUS

The danger of toxic chemicals.

LEARNING OUTCOME

The children will learn to identify toxic household cleaners and learn that the symbols are representative of dangerous products.

BACKGROUND INFORMATION

A surprising number and variety of common household products are composed of substances that are classified as hazardous, including furniture, floor, shoe and metal polishes, spot and stain removers, moth balls, paints, varnishes, stains, solvents, drain cleaners and openers, oven cleaner, chlorine bleach, toilet bowl cleaners, carpet cleaners, lye, batteries, insect repellents, bug sprays, flea collars, chemical fertilizers and weed killers.

These and many other products are identified with internationally recognized symbols according to the type of hazard they represent.

In spite of the toxic, explosive, corrosive or flammable warning symbols, many of these hazardous products are improperly stored under kitchen sinks and in bathrooms, basements and garages where they are easily accessible to children. Sometimes dangerous products are transferred from the original container to, for example, a pop bottle, which obviously increases the danger of accidental ingestion. Learning to recognize the warning symbols can help to prevent accidents.

Often municipalities will hold hazardous waste collection days. These hazardous products can then be taken to designated sites for proper disposal.

Horrible Hazards

ACTIVITY CLASSIFICATION

Pairs
Small Group
Individual

KEY WORDS

* Hazardous materials
* Toxic substance
Household cleaners
Flammable (ignitable) substance
Explosive
* Corrosive substance
Chemicals
Storage

TEACHER TIPS

Familiarize the children with the universal symbols identified below

materials such as ammonia, bleach and pool chemicals that can create an explosion or release deadly vapor when mixed.

materials such as pesticides, cleaning fluids or rat poison that are poisonous or lethal to animals, plants and humans.

substances such as battery acid of drain cleaner that eat away at materials.

liquids that can ignite, such as gasoline, barbecue lighter fluid or solvents.

(Symbols – Consumer and Corporate Affairs Canada)

Encourage discussion prior to this activity related to toxic chemicals and their danger.

Collect a variety of samples of household cleaners that the children would recognize: oven cleaners, drain cleaners, disinfectants, silver polish, pot cleaner, spray cleaner, furniture polish, paint, brush cleaner, pesticides, bleach, ammonia, stain removers, solvents.

Make sure that an adequate supply of reusable goods is available for the construction of model homes: boxes, toilet rolls, cardboard, corrugated paper, tongue depressors, cellophane wrap.

Horrible Hazards

Should materials not be available for the children to create a model of a house, paintings or sketches of houses would be effective. Have the children paste pictures of hazardous materials in the appropriate storage places.

SAFETY PRECAUTION
Adult supervision is necessary.

DISPOSAL OF HAZARDOUS WASTES.

- Never pour hazardous wastes down a drain. Hazardous wastes can corrode plumbing, damage septic tanks and release poisonous fumes.
- Never put hazardous wastes out with your garbage. Toxic chemicals may escape into the air or groundwater at landfill sites.

SOLUTION:

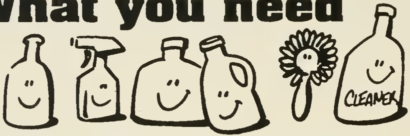
- Toxic waste depot
- Community special pick-up days

For more information, contact:

Household Hazardous Waste Program
Waste Management Branch
Ministry of the Environment
135 St. Clair Ave. West
Toronto, Ontario
M4V 1P5

Horrible Hazards

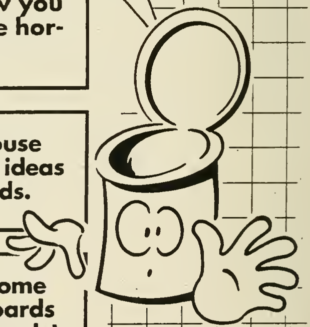
What you need



- **A collection of household cleaners**
- **A variety of reusable materials**
- **Scissors**
- **Glue**

What to do

1. Find a friend to work with.
2. Examine household cleaners.
3. Talk about safe storage of hazardous household cleaners.
4. Read the labels carefully. Look for the hazard symbols. Sort the cleaners into groups that have the same symbols.
5. Make a house by using the reusable materials. Show where and how you would store the horrible hazards.
6. Display your house and share your ideas with other friends.
7. When you go home check the cupboards for horrible hazards!
8. If you had to dispose of these, what would you do?



WATCH OUT! BEWARE! READ CAREFULLY!

Not only are hazards toxic and corrosive some are even flammable and explosive!

Horrible Hazards

ARTS

HORRIBLE HAZARD

Children in small groups plan, prepare and present a short play about horrible hazards.

BETTER BEWARE!

Children create large posters of the symbols: Toxic - Flammable - Corrosive - Explosive. Paintings of samples of each type of chemical should be mounted beside or around the symbol. Display them around the school. They may want to put a large heading on the poster "Do not pour it down the drain."

MEDIA

NOW HEAR THIS!

Children create and dramatize TV advertisements about the dangers of toxic chemicals. These can be videotaped and played for other classes.

LOOK OUT!

Children search for and cut out advertisements from the paper /or flyers about toxic household cleaners. These are mounted on large poster papers and the words LOOK OUT are printed in heavy black lettering on top of the advertisements. Mount the posters.

COMMUNICATION

I'M A HAZARD!

Children write stories about life as a horrible hazard.

ONE STEP FURTHER

What's for sale?

Children plan an excursion to local shopping centre and in various shops examine the variety of cleaners for sale and their storage space.

Greener CLEANERS

Teaching About Garbage

ACTIVITY AT A GLANCE

The children will follow recipes for greener cleaners and make environmentally friendly products.

ENVIRONMENTAL FOCUS

The environmental hazard of household cleaners.

LEARNING OUTCOME

The children will understand the hazards of household cleaners and learn that home-made cleaners are as effective and environmentally friendly.

BACKGROUND INFORMATION

Every year the average Canadian home consumes 45 aerosol and 24 non-aerosol cleaners, solvents, spot removers, deodorants, drain openers and polishes.

It is estimated that up to 30% of the average family's weekly shopping bill goes to pay for cleaners.

Many of these products contain substances toxic to humans and to the environment. Once they've journeyed throughout kitchens, bathrooms and garages, and sewers, landfills and incinerators, these chemicals can contaminate waterways, soil and ground water, and can travel back to us via our drinking water.

Homemade cleaners, which are usually safer and much cheaper, can be substituted for many commercial products. Many books and guides are available that include non-polluting home recipes containing environmentally-friendly ingredients such as vinegar, pure soap, baking borax, washing soda and ammonia.

Home-made cleaners help to save resources, reduce energy consumption, keep poisonous chemicals out of the environment, and cut down on the amount of packaging and aerosol cans going to landfills.

Greener CLEANERS

ACTIVITY CLASSIFICATION

Individual
Small group
Pairs

KEY WORDS

- * Toxic substance
- * Corrosive Substance
- Flammable (*ignitable) substance
- Explosive
- Chemicals

TEACHER TIPS

The following ingredients will be required:

white vinegar - water - pure soap flakes - washing soda - olive oil

The following materials will be required:

measuring cups - jars and lids - labels - rags - recipes - baking tins

Volunteers would be helpful to assist in carrying out this activity.

RECIPES

LAUNDRY POWDER

250 ml pure soap flakes
25-50 ml washing soda

1. measure the ingredients
2. pour the ingredients into a jar
3. shake
4. label the jar

FURNITURE POLISH FOR VARNISHED/LACQUERED/SHELLACKED FURNITURE

25 ml olive oil
15 ml white vinegar
1 L water

1. measure ingredients
2. pour ingredients into a jar
3. shake
4. label the jar
5. works best when warm
6. after using, rub dry with a soft cloth

WINDOW AND GLASS CLEANER

30 ml vinegar
1 L water

1. measure ingredients
2. pour ingredients into jar
3. shake
4. label the jar

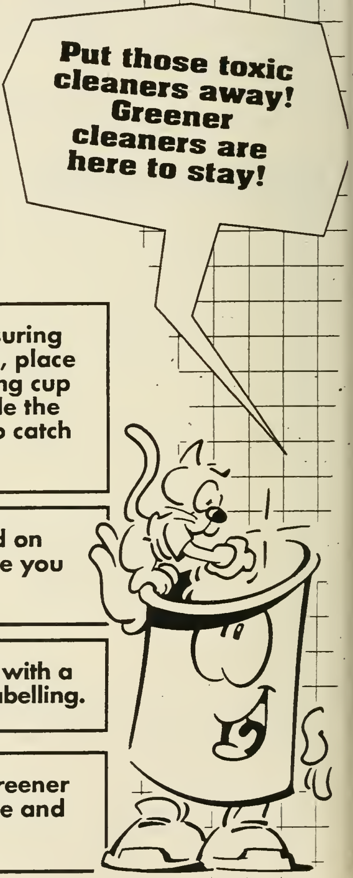
Greener CLEANERS

What you need

- Recipe card
- Rag
- Measuring cup
- Ingredients
- Baking tin
- Jars and lids

What to do

1. Work with a friend or by yourself.
2. Decide what you would like to make.
3. Choose the recipe card.
4. Gather the materials and ingredients.
5. Before measuring and pouring, place the measuring cup and jar inside the baking tin to catch any spills
6. Screw the lid on tightly before you shake.
7. Wipe the jar with a rag before labelling.
8. Take your greener cleaner home and try it out!


Put those toxic cleaners away! Greener cleaners are here to stay!

Greener CLEANERS

RESEARCH

MORE GREENER CLEANERS

Children research to find more greener cleaner recipes to write out on recipe cards. The cards can be printed and put together to make gifts for friends and relatives.

MUSIC

WINDOW WASHING SONG-

Canada is Music
Gorden V. Thompson
Toronto, Ontario
Pg. 68

SCIENCE

WIPE THAT STAIN AWAY

Children find out what kind of stain removers work best on different types of stains and materials.

NATURAL DYES

Children collect plant parts and enjoy making and using their own natural dyes.

ONE STEP FURTHER

Healthy House

Children are encouraged to make a list of household cleaners found in their homes and by recipes that they have researched, find environmentally friendly alternatives.

The Great EXCHANGE

ACTIVITY AT A GLANCE

The children will be involved in an exchange of toys and games.

ENVIRONMENTAL FOCUS

Many things considered garbage are not!

LEARNING OUTCOME

The children will learn that what is old and no longer of interest to them personally may be enjoyed by someone else and should not end up as garbage.

BACKGROUND INFORMATION

Reducing personal consumption – and reusing old or unwanted things – helps to conserve resources and energy, and reduces our garbage output.

The amount of garbage going to landfills can be reduced by offering unwanted or out-grown clothing, toys, games, furniture and appliances to friends and neighbours, schools or local second-hand stores.

Old sheets, curtains and towels can be used as giant rags in schools, and fancy additions to the dressing-up chest are often welcome.

Magazines and books could go to hospitals, women's centres, senior citizens' homes and halfway houses. The Canadian National Institute for the Blind (CNIB) and most opticians accept old eye glasses.

Some cities have collection centres where residents, the business sector and governments can donate unwanted reusable items that would otherwise find their way to the landfill.

The Great EXCHANGE

BACKGROUND INFORMATION

After reducing, reusing is the second-most important R as reusing helps to divert unwanted things away from the waste stream.

Taking the needs of others into consideration by assessing the reusability of an unwanted item can help to prolong its lifespan and keep it out of the landfill.

ACTIVITY CLASSIFICATION

whole group

KEY WORDS

Exchange
*Reuse

TEACHER TIPS

Prior to the day of the great exchange, discuss with the children the fact that their used toys and/or games may be new and exciting to someone else.

Ask if there are games and toys the children may be willing to exchange with each other. Discuss the fact that some toys and games will be in better shape than others but that they are still worth reusing. With a little stitching, painting or repairing, toys can be made to look just like new again.

Decide with the children the criteria for allotting points to the toys and games.

For example:

Is a doll with clean hair and clothing worth 100 points?
Is a used puzzle with all pieces intact worth 75 points?
Is a used small plastic car worth 20 points?
Is a repainted metal truck worth 80 points?

The Great EXCHANGE

As children bring their toys and games for The Great Exchange, allot points and keep track of the number of points each child earns. Decide on the date for The Great Exchange.

Request parental involvement and/or assistance from senior students. Decide on the room arrangement for the event. Have shopping tokens available for the children. These are obtained from the bank on the day of the event.

The number of tokens that each child receives from the Bank corresponds to the number of points allotted to the toys and/or games each brought in.

Prepare token slips for the children which they will hand to the banker in order to receive their tokens.

Sample token slip:

_______________ has earned _________ points for his/her donations to The Great Exchange.

____
Teacher's signature

____
Child's signature

Tokens received ____________________
Child's initials

Banker ______________________________

Set up the "Bank"

Arrange toys and games in an attractive and easily accessible manner. Have a great time!

The Great EXCHANGE

tag
Teaching About Garbage

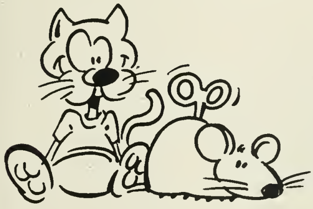
What you need

- **A signed token slip for the banker**
- **Tokens (from the Bank)**

What to do

1. Take your signed token slip to the Bank.
2. Collect your tokens.
3. Have a great time shopping!
4. When all of your tokens have been spent and The Great Exchange has ended, gather together with your classmates and teacher to share your new toys and games and to talk about the event.

   Think about: was this an environmentally responsible activity? Did we find a good way to reduce and reuse garbage.
5. Take your new toys and games home and have fun!



WAIT! WAIT! WAIT!
don't throw it away!
let's exchange games and go home and play!

The Great EXCHANGE

ENVIRONMENTAL STUDIES

DANDY DONATIONS

Children make collections of used toys, games and books to donate to the Children's Hospital, The Salvation Army, Children's Aid Society and needy families in their schools.

COMMUNICATIONS

GIVE ME A SECOND CHANCE!

Teacher saves old readers, novels and big books from which pictures are removed. Children reuse the pictures and create new stories.

NOW I LIVE WITH MARTHA!

The children are encouraged to write stories about the new toys and games that they purchased at The Great Exchange. The stories are written as if the toy and/or game is speaking.

THE ARTS

BAG IT!

From material scraps or reusable yardage children sew shopping bags for personal use or gifts.

MATHEMATICS

THINK ABOUT IT!

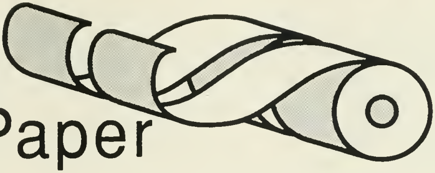
Children price toys and games that were brought in for The Great Exchange and total up to discover how much money would have been thrown away had the items been discarded.

ONE STEP FURTHER

Swap it!

Children help to plan a primary division Swap it Day where all children have the opportunity to swap one of their toys for another.

Paper Pulp Paper



ACTIVITY AT A GLANCE

The children will have the opportunity to make new paper from recycled newspaper.

ENVIRONMENTAL FOCUS

Newspaper recycling.

LEARNING OUTCOME

The children will understand how to make new paper from recycled newspaper.

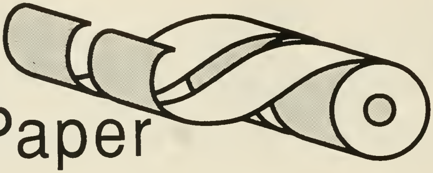
BACKGROUND INFORMATION

Paper, including old newspaper, magazines, corrugated cardboard, paperboard, computer print-outs, makes up 35% of the garbage placed out at the curb every week.

Every tonne of old newspaper recycled represents a saving of 19 full grown trees.

Reducing paper consumption by practising economy, recycling paper, using reusable instead of disposables and purchasing non-chlorine bleached paper with a high recycled fibre content saves trees, forest ecosystems, habitat and wildlife and helps prevent air, soil and water contamination.

Paper Pulp Paper



ACTIVITY CLASSIFICATION

Small group
Individual

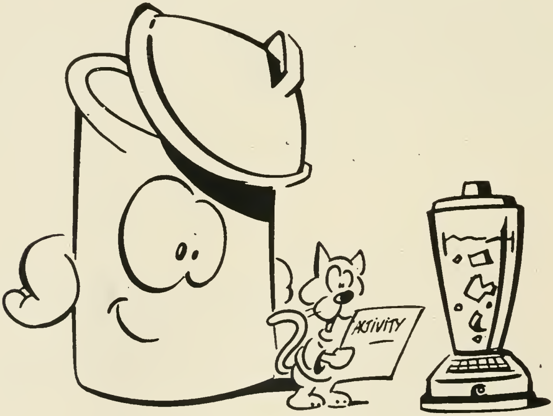
KEY WORDS

Pulp
* Recycling
Mixture
Screen
Newspaper
Iron

TEACHER TIPS

A blender will be necessary for carrying out this activity, as well as adult supervision and assistance. Children should be encouraged to bring in newspaper for recycling. Prior to the activity the children should have an elementary understanding of the newspaper recycling process (see Canadian Junior Green Guide in bibliography).

The vegetable peeling are used to give body and colour to the paper.



Paper Pulp Paper

What you need

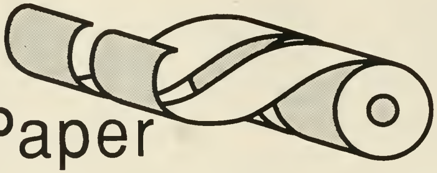
- **Wood frames with screens**
- **Blender**
- **Warm water**
- **Newspaper**
- **Cloths**
- **Sponge**
- **Iron**
- **2 plastics tubs**
- **Vegetable peeling**
- **Mixing spoon**

Adult supervision and assistance are necessary

What to do

1. Pour warm water into two plastic tubs, filling them half way.
2. Tear up newspaper into small pieces and soak it in one of the tubs. Add vegetable peelings. Stir.
3. Fill the blender container half way with your mixture and blend at medium speed until the mixture is smooth and creamy.
4. Pour the mixture into the second tub. Stir thoroughly.

Paper Pulp Paper



5 Dip the frame into the basin, screen side up and scoop up some of the pulp. Lift out carefully and let the water drain.

6 Lay the frame, with the screen face up, on a table and place a cloth gently on top of it.

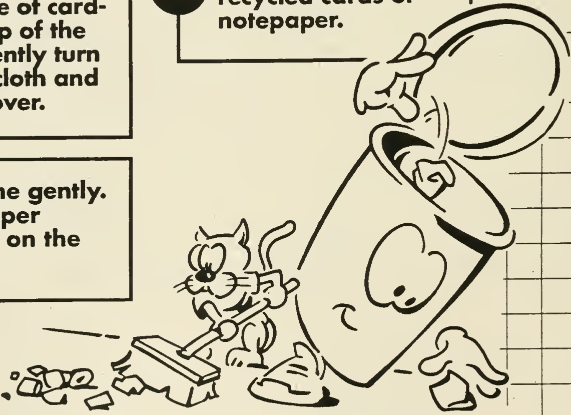
7 Place a piece of cardboard on top of the cloth and gently turn the screen, cloth and cardboard over.

8 Lift the frame gently. The new paper should stay on the cloth.

9 Cover the new paper with a clean, dry cloth and iron with medium heat.

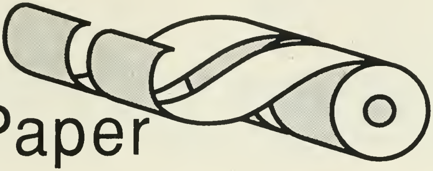
10 Lift new paper carefully and set aside to dry.

11 Make your own recycled cards or notepaper.



Clean up your area carefully, thank you!

Paper Pulp Paper



Teaching About Garbage

ENVIRONMENTAL STUDIES

RECYCLING REVISITED

The teacher and children plan an excursion to a nearby recycling plant.

ARTS

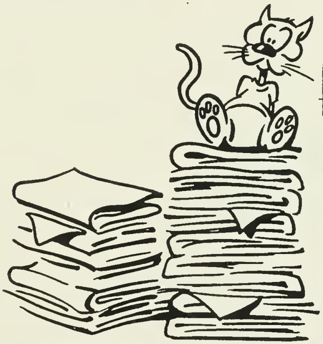
MURAL MURAL ON THE WALL

The children create a mural telling a recycling story.

COMMUNICATION

ONCE I WAS A...

Children create a Big Book using the pattern: Once I was..., And now I'm a...



ONE STEP FURTHER

Pile them up!

Children collect newspaper for a two-week period. Papers are counted and bound in groups of ten. Children estimate the number of trees that they have saved by collecting the papers for the recycling plant.

Call the Recycling Council of Ontario to find out how close their estimations were to the exact numbers of trees saved (1-800-263-2849).

WORMY WONDERS

Teaching About Garbage

ACTIVITY AT A GLANCE

The children will make their own composter.

ENVIRONMENTAL FOCUS

Composting.

LEARNING OUTCOME

The children will learn that decomposed kitchen and yard waste can make great soil conditioner and that by composting we help to reduce the amount of garbage in landfills.

BACKGROUND INFORMATION

People are often squeamish about worms, but the lowly earthworm is perhaps the most important animal in the soil.

It makes more soil than any other creature, and its extensive network of tunnels helps air and water reach the roots of plants. This also helps to provide other beneficial soil creatures with air and water.

Worms turn the soil by moving deep soil up to the surface and by dragging plant material underground, thus helping to bring humus into deep soil.

All the worms in a grassy area the size of a football field can move one truckload of soil a year, and one cup of soil may contain more than 5 billion living creatures.

About one third of household garbage consists of kitchen scraps and yard wastes which, with the help of the worms and other soil organisms, can be transformed into nutrient-rich soil conditioner.

Composting organic wastes saves landfill space and provides a source of good soil for a garden.

WORMY WONDERS

ACTIVITY CLASSIFICATION

Whole group

KEY WORDS

*Composting
*Vermicomposting
Red worms
Decomposition
*Organic material

TEACHER TIPS

The classroom of school should have a garden centre where children can put their compost to good use.

The teacher should obtain: a plastic garbage can and lid, soil, worms, shovels or large stirring stick.

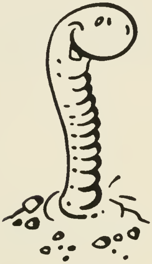
When the activity is ready to commence, the teacher should poke holes in the can or assist children to poke the holes (all over).

Prior to the activity have the children bring in grass cuttings, organic waste (fruit and vegetables peelings, coffee grounds and filters, teas bags, egg shells) and decaying leaves.

Environment Ontario has published a fact sheet, Vermicomposting, telling you where to obtain red worms. Information can also be obtained at the Recycling Council of Ontario (416-960-1025) or (1-800-263-2849).

WORMY WONDERS

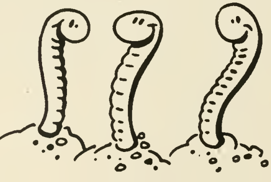
What you need



- **Red worms**
- **A plastic garbage can that is full of holes**
- **The lid**
- **Soil**
- **Water**
- **Kitchen waste**
- **Yard waste**
- **Shovel or stirring stick**

What to do

1. Start the composter with three thin layers:
   1 - grass clippings and soil
   2 - kitchen waste and soil
   3 - decaying leaves and soil
2. Put a shovel full of soil on top of the three layers.
3. Stir the mixture.
4. Add the red worms.
5. Slightly dampen the mixture.



Worms are clever as can be they can make compost for you and me!

WORMY WONDERS

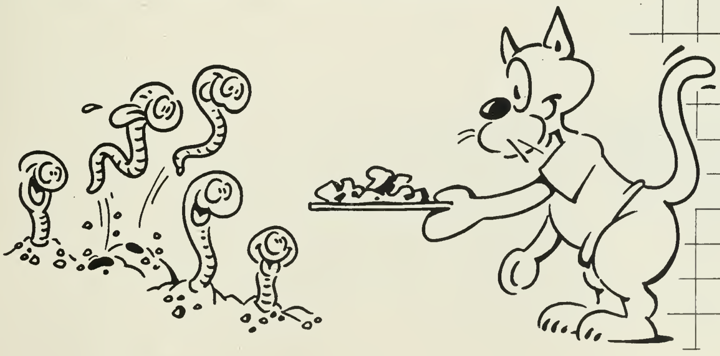
6 Put the lid on top of the can and place it in a sunny spot. Make sure that the air can move freely all around the can.

7 Add kitchen waste, soil and leaves or grass daily until the composter is three-quarters full. Slightly dampen each time.

8 Now let the WORMY WONDERS work!

9 Within a month you should be able to feed your garden plants rich soil conditioner.

IF YOU WANT THE WORMS TO KEEP WORKING DON'T FORGET TO FEED THEM!



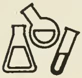
WORMY WONDERS

ENVIRONMENTAL STUDIES

A USEFUL GIFT

Children package their "home made" compost and deliver it to friends and family.

SCIENCE



THE WORMY FACTORY

Feeding, changing bedding and removal of egg capsule are learning experiences the children will be involved in when "THE WORM FACTORY" comes to visit.

Contact:
The Worm Factory
129 Sherbrooke Street East
Perth, Ontario
K7H 1B1
Tel.: (613) 267-5540

MATHEMATICS

HOW MUCH COMPOST DO WORMY WONDERS MAKE?

Children measure, weigh and graph monthly generation of compost.

RESEARCH

LEARN ALL ABOUT US!

Children collect books about worms and research individual interests.

ONE STEP FURTHER

What is Humus?

Children compare the characteristics of different soil types and learn about the importance of humus. Children make their own soil.

What's Buried HERE?

ACTIVITY AT A GLANCE

The children will create a "mini" sanitary landfill.

ENVIRONMENTAL FOCUS

Sanitary landfills.

LEARNING OUTCOME

The children will become familiar with some of different structural parts of a landfill site and observe how some materials break-down.

BACKGROUND INFORMATION

In the last twenty years the problem of land disposal of waste has become widely recognized. The volume of waste being disposed of, the chemicals leaching from the landfill site and the methane gas the site produces are the major concerns.

The total amount of waste generated in Ontario in 1989 from residential, industrial and commercial sources totalled 10 million tonnes. 40% of this was generated by residential households. With many landfill sites in Ontario slated for closure in the next few years, the problem of finding proper disposal sites for our garbage is exacerbated.

Chemicals used in all aspects of our lives are often disposed of with our waste. Some chemicals are inert, but others are highly reactive and cause great damage to our environment. Certain chemicals are biodegradable – they can be broken down by natural process and are not harmful to the environment. There are also many types of metals in garbage, such as lead and mercury. They are extremely toxic and persist in the environment for a long time.

What's Buried HERE?

BACKGROUND INFORMATION

Methane is a colourless, combustible and potential explosive gas produced by the bacterial decomposition of waste.

Modern landfill site design, similar to the one in the student activity sheet, takes into account these problems. Siting is restricted to environmentally suitable areas. The bottom is covered with an impermeable liner of clay or synthetic material to prevent leachate or methane from leaving the site. A system of pipes is installed above the liner to collect the leachate.

ACTIVITY CLASIFICATION

Individual
Small Group

KEY WORDS

- * Landfill Site
- * Leachate
- * Groundwater
- Clay soil
- Plastic sheets
- * Decomposition
- * Biodegradation
- Pipes
- Storage tank

TEACHER TIPS

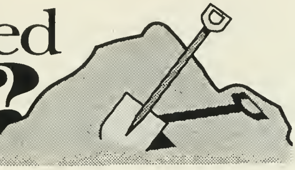
The children should be familiar with the key vocabulary prior to this activity. A planned excursion to a landfill site would enhance the children's understanding.

Have the children bring in shoe boxes from home.

Other necessary materials: a variety of scrap material – plastic wrap, orange peel, egg shell, aluminum foil, newsprint, nails.

Have the children make "buried here" signs out of reusable materials, to indicate what has been buried in their landfill sites.

What's Buried HERE?



What you need

- Shoe box
- Plastic sheet
- Sand
- Large straws
- Six types of garbage
- Soil
- A "Buried Here" sign for each type of garbage
- Protective gloves (optional)
- Trowel OR small shovel

What to do

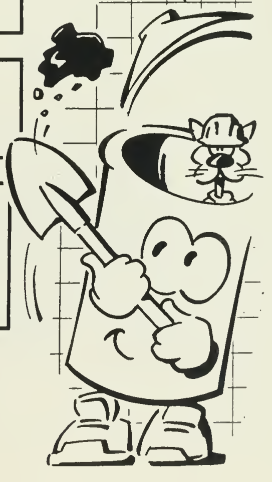
1. Line the bottom and the sides of a shoe box with plastic sheet.

2. Join two or three straws together for a pipe line and lay it on top of the liner (see diagram). Poke a hole through the shoe box (and liner) so that the "pipe" can come through. Tape around the hole. Cover the liner and "pipes" with a thin layer of sand.

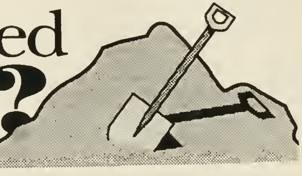
3. Fill the box half-way up with soil.

4. Bury six types of garbage.

5. Mark where your garbage is buried with your "Buried Here" sign.


Is a landfill really a friend or foe? Make one here and then you'll know.

What's Buried HERE?



6 Cover the garbage with soil and press down firmly.

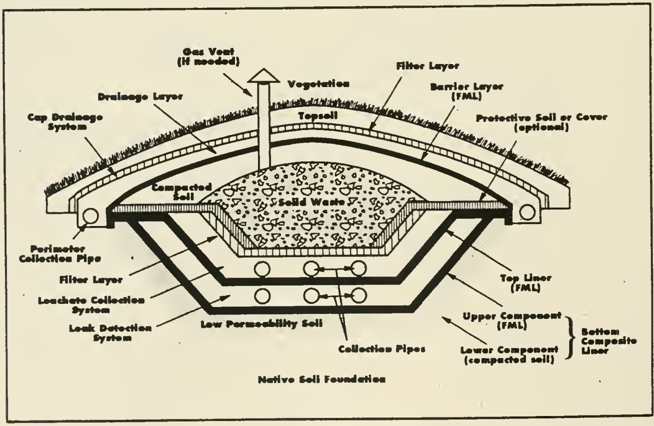
7 Gently water the landfill.

8 Place your mini landfill on a shelf.

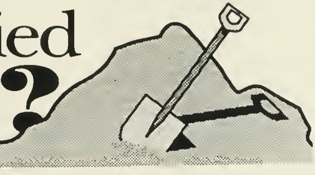
9 Keep the landfill moist.

10 Check every two weeks for leaks and to see if the garbage is leaking down.

This is a modern site. Notice the vent pipes for methane and the pipes in the bottom layer which are used to collect the leachate.



What's Buried HERE?



RESEARCH

WHAT'S THE DIFFERENCE?

Children research and discover the difference between an open dump and a landfill site.

MEDIA

READ ALL ABOUT IT!

Children search through daily newspaper for articles related to landfill sites.

ENVIRONMENTAL STUDIES

COMMUNITY SITES

Children visit areas that were once landfill sites and note the use of the land.

TECHNOLOGY

MAGNIFICENT MACHINES

Children learn about the various vehicles involved at a landfill site.

ONE STEP FURTHER

Caretakers of the Earth Club

Children create a club whose goal is to help others learn about reducing the amount of discarded waste.

BIBLIOGRAPHY

This module is given to aid the teacher in building up a library on environmental issues. The particular focus is waste management but most books cover much more than this specialized topic. Students' literature books are highlighted since they can enhance the classroom activities significantly. Most school librarians are looking for good titles to purchase and these can be suggested.The bibliography is divided into the following section:

STUDENT REFERENCE
TEACHER REFERENCE
PRIMARY AND JUNIOR ENVIRONMENTAL SECTIONS
CASSETTE TAPES
MAGAZINES
VIDEO CASSETTES

Literature can also be obtained from the federal and provincial governments. Environment Ontario has a number of booklets on topics such as water, sewage treatment, acid rain, pesticides and spills. A catalogue and the publications can be obtained from:

Environment Ontario
Public Information Centre
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
or call 416-323-4321

Materials from Environment Canada can be obtained from:

Environment Canada
Ottawa, Ontario
K1A 0H3

or call 613-998-4090

STUDENT REFERENCE

A LIGHTER LOOK BOOK SERIES

Poison Beware!
Steve Skidmore
Worm's Eye View
Kipchak Johnson
What a Load of Trash
Steve Skidmore
Down the Drain
Thompson Yardley

Millbrook Press Inc., USA (1991)
$5.99 each

This series looks at how we are polluting the Earth, and how we must take better care of it if we don't want things to get out of control. All of the books in the series succeed in getting serious messages across in a light and lively way. Full colour illustrations throughout.

AMAZING DIRT BOOK

Paulette Bourgeois
Addison-Wesley, USA (1990)
$8.95

This book includes instructions for many projects designed to raise awareness on the environment, such as building a compost heap, planting a wildflower garden and creating an indoor rainforest.

BEAUTIFUL JUNK

Karen Brackett and Rosie Manley
Simon and Schuster, USA (1990)
$12.95

This book clearly and simply explains over two hundred creative ways to reuse non-recyclable containers, and other throwaways, for school projects. Permission is given for the individual purchaser to reproduce designated material in this book for classroom and individual use only. Black and white illustrations, and patterns to cut out.

BIRD WISE

Federation of Ontario Naturalists
$9.95

This book includes details on how to build bird feeders from reusable materials. It also contains information on bird-watching and bird identification activities. Black and white illustrations.

BUG WISE

Federation of Ontario Naturalists
$9.95

This book is packed full of facts and activities which emphasize bug observation rather than bug collecting. It provides information on alternatives to pesticides, rainforest destruction and endangered species. Black and white illustrations.

BURIED IN GARBAGE

Bobbie Kalman and Janine Schaub
Crabtree Publishing Company, Can (1991)
$9.95

This book covers everything from the natural resources used to manufacture our consumer goods and packaging to waste generation, collection and disposal. There is a chapter devoted to hazardous products in the home, and alternatives to disposing of valuable materials in garbage dumps and incinerators, such as reusing, recycling and composting, are also covered. Illustrated with colour photographs and diagrams.

CITY SAFARIS

Carolyn Schaffer and Erica Fielder
Sierra Club, USA (1987)
$15.95

A Sierra Club guide to exploring urban surroundings for both grown-ups and kids. The emphasis is on exploration rather than a "guided tour" approach. Full colour photographs.

EARTHWATCH: BBC FACTFINDER

Penny Horton
BBC Books, UK (1990)
$6.95

This book gives dozens of facts on "the biggest rubbish dump in the universe." It explains what we are doing to the Earth's air, soil and water; why the world's resources are at risk; why some animals are nearly extinct; and why the rainforests are being destroyed.

There is a lot of information on environmental problems - but it's not all gloom and doom. The book gives practical tips on the things we can do to help clean up our act. Interesting full colour illustrations throughout.

EARTHWATCH SERIES

Clean Air, Dirty Air
Waste and Recycling
Trees for Tomorrow
Food for Thought
Lynn Patchet et al
A & C Black Ltd.,
$17.95

A new series which explains how human activities affect the environment. It investigates the local environment to reach an understanding of the larger global issues. Full colour illustrations throughout.

EARTH ALERT SERIES

Acid Rain
The Oceans
Pesticides
Endangered Species
Drought
Toxic Waste
The Ozone Layer
The Greenhouse Effect

Various Authors
$15.50 each

Each book in the series is designed to help young readers understand what is happening to the environment and offers suggestions on what they can do to help. Full colour illustrations throughout.

EARTH BOOK FOR KIDS

Linda Schwartz
The Learning Works Inc., USA (1990)
$12.95

This book has scores of educational activities and ideas for helping to heal the environment. Unfortunately, the one drawback to the paperback edition is that the pages fall out. Black and white illustrations.

EARTH CYCLES AND ECOSYSTEMS

Beth Savan
Kids Can Press, Can (1991)
$9.95

This book looks at habitats, food chains and water cycles, and what happens when human actions disrupt these natural systems. It is packed full of interesting information, activities and puzzles. Illustrated throughout with good, clear drawings and diagrams in full colour.

EXPLORING NATURE

Jim Flegg
The Hamlyn Publishing Group Ltd., UK (1989)
$3.50

This book teaches about how to explore natural habitats such as woodlands, wetlands, and meadows, and how to discover and observe the rich variety of life to be found. It is a valuable guide, packed with tips, techniques and projects, to help young naturalists explore nature. Full colour photographs, illustrations and diagrams throughout.

50 SIMPLE THINGS KIDS CAN DO TO SAVE THE EARTH

The EarthWorks Group, USA (1990)
$10.50

A book full of experiments, facts, and exciting things to do for kids which will enable them to gain an understanding of the environmental problems facing the world today. It is an empowering book that demonstrates ways in which young people can participate in turning things around.

50 THINGS KIDS CAN DO TO RECYCLE

EarthWorks Group, USA (1991)
$7.95

This fully illustrated handbook is written from a child's perspective. It contains information on how to recycle everything from glass bottles to old bicycles and unwanted toys and books.

GARBAGE! WHERE IT COMES FROM, WHERE IT GOES

Evan and Janet Hadingham
Simon and Schuster Inc., USA (1990)
$7.95

A book packed full of facts on how packaging, over-consumption and fast foods have over-burdened our waste disposal systems. Topics cover the health and environmental impacts associated with methods of waste disposal, including landfilling, incinerating and ocean dumping.

The book suggests ways to make our Earth a healthier place to live for all life forms. Full colour photographs throughout.

GOING GREEN: A KID'S HANDBOOK TO SAVING THE PLANET

John Elkington, Julia Hailes, Douglas Hill
and Joel Makower
Puffin Books, UK (1990)
$11.95

A book designed to convince young people that they can change the world by getting grown-ups to listen. It shows them how to turn into eco-sleuths to investigate ways in which practices can be greened at home and at school, and how they can be part of the green consumer movement. Lively, full-colour illustrations throughout.

GOOD PLANETS ARE HARD TO FIND

Roma Dehr and Ronald M. Bazar
Namchi United Enterprises, Can (1989)
$5.95

Deforestation, species extinction, recycling, nuclear energy and smog are just a few of the topics included in this dictionary-format book. Every page is very colourful.

GREEN WORLD SERIES: THE PUZZLER'S BOOK

Owl Magazine, Editors
Greey de Pencier Books, Can (1990)
$7.95

This book contains information and activities on science, the natural world, and the global environment. Black and white drawings.

GREEN WORLD SERIES: THE RECYCLING BOOK

Owl Magazine, Editors
Greey de Pencier Books, Can (1991)
$7.95

This is an activity book on the 4Rs - Reduce, Reuse, Recycle and Recover. It includes activities for recycling paper, metal, glass and natural materials, which are perhaps best used in places without municipal recycling programs.

It also makes suggestions for reusing non-recyclable packaging and containers. Black and white drawings and diagrams.

HOW GREEN ARE YOU?

David Belamy
Potter Books, Can (1991)
$19.91

An information book about how to help the environment. Activities on how to help are included as well as suggestions for choosing green alternatives when shopping for the home and garden. Full colour illustrations.

I DIDN'T KNOW THAT!

Owl Magazine, Editor
Greey de Pencier Books, Can (1990)
$9.95

This is a book about the fascinating science in everyday life. Colour photographs and full colour illustrations.

JUNGLE RESCUE: SAVING THE NEW WORLD TROPICAL RAINFORESTS

Christina Miller and Louise Berry
Macmillan, USA (1991)
$19.95

This is a book designed to inspire young people to become involved in helping to save the rainforests. Colour and black and white illustrations.

KID'S NATURE BOOK: 365 INDOOR AND OUTDOOR ACTIVITIES

Susan Milord
Williamson Publishing Company, USA (1989)
$18.50

A popular book on indoor and outdoor activities for every day of the year that encourage exploration, observation, and respect for all life forms. Illustrated.

LEARNING AND CARING ABOUT OUR WORLD

Gayle Bittinger
Warren Publishing house, Inc., USA (1990)
$7.99

This activity book has 120 practical and easy-to-use ideas to introduce young children to the wonders of their world and to show them how they can help to take care of it. It is divided into sections about, land, air and water, each filled with experiments, art and language activities, learning games and songs. Black and white illustrations and diagrams.

LET'S GROW! 72 GARDENING ADVENTURES WITH CHILDREN

Linda Tilgner
Storey Communications Inc./Garden Way Publishing, USA (1988)
$13.95

This book contains dozens of interesting gardening projects designed to instill a love of nature in children and adults alike. Illustrated.

LET IT ROT!

Stu Campbell
Storey Communications Inc., USA (1990)
$7.50

This book takes an easy-going approach to demystifying composting. It covers all the usual methods as well as some less-usual ones. It is an excellent resource with a wealth of practical information on every aspect of compost-making, from composter construction to the end product. Black and white drawings.

LOOKING AT SERIES

David Suzuki, with Barbara Hehner
Stoddart Publishing, Can (1989)
$9.95 each

This series concentrates on observation through experimentation. The latest book in the series is called The Environment. Full colour photographs and illustrations throughout.

OPERATION EARTH SERIES

Air Scare
Waste War
Dying Forests
People Trap
Energy Gap
Troubled Waters

Wendy Madgwick and Steve Parker, Editors
A Templar Book, UK, published by B. Mitchel, Can (1991)
$7.99

Operation Earth is a new, colourful, highly readable series which deals with important environmental issues facing the entire world today. These books are well-organized with clearly presented information on the problems humans have created. Included in each book is a section on what we can all do to help. Excellent full-colour illustrations and photographs throughout.

PLANT WISE

Federation of Ontario Naturalists
$9.95

Through a series of projects, facts and experiments, this book demonstrates the vital role plants play in purifying air and water, and in preventing soil erosion. Contains lots of useful information. Black and white illustrations.

PROJECT ECOLOGY SERIES

Air Ecology
Land Ecology
Urban Ecology
Water Ecology
Plant Ecology
Animal Ecology
Various Authors

Wayland Publishers Inc., UK (1987)
$20.00 each

This informative, activity-based series looks at the way living things affect and are affected by their environments. Nature's own cycles of change are examined along with the impact of human activities on the planet. Full colour illustrations and photographs throughout.

RADS, ERGS AND CHEESEBURGERS: THE KIDS GUIDE TO ENERGY AND THE ENVIRONMENT

Bill Yanda
John Muir Publishing, USA (1991)
$16.95

A book about energy consumption and its environmental implications to help children understand the cumulative impact of everyday actions on the environment. Linkages are made, for example, between little things like cheeseburgers and major catastrophes like oil spills in Alaska. Two-colour illustrations throughout.

SAVE THE EARTH

Betty Miles
Alfred Knopf Publishers, USA (1991)
$11.95

This book provides over 100 simple suggestions for kids on how to help save the planet. A glossary and a list of environmental organizations are included.

SAVE OUR PLANET

Diane MacEachern
Dell Publishing, USA (1990)
$12.95

This book gives a brief overview of our environmental problems followed by chapters on how we can help save our planet at home, at school, at the supermarket, in the community and at the workplace. Each section has a list of sources, ideas and reasons for changing the way we do things. There is an appendix of resources for further information organized on an issue-by-issue basis, and also a list of environmental organizations which specifies the particular problems each one addresses. Black and white drawings and tables.

SCHOOLYARD/BACKYARD CYCLES OF SCIENCE

Jerry DeBruin
Good Apple Publishers, Inc., USA (1989)
$11.95

Packed full of science activities for Grades 3-9+, this book can be used in conjunction with units and projects on the environment. Included are many activities on biological cycles. Permission is given by the publishers to reproduce student activity pages for classroom use. Black and white illustrations throughout.

SPRING CLEAN YOUR PLANET

Ralph Levinson
Arrow Books Ltd., UK (1987)
$4.99

This pocket-sized book is full of enjoyable, easy-to-follow experiments designed to help kids discover what is happening to our environment. It encourages young people to decide on which actions to take, and how to bring anything

that is wrong to people's attention by assuming the role of scientist, journalist and politician. Black and white drawings throughout.

THE CANADIAN JUNIOR GREEN GUIDE

Teri Degler and Pollution probe
McClelland and Stewart Inc., Can (1989)
$12.95

This handbook shows young people how they can make environmentally-sound choices at home, at school and at the store to help make the world a cleaner, greener, healthier place to live. It is good for research work for projects, and for providing topics for class discussion. It contains lots of colourful illustrations, photographs and tables.

THE KIDS' ENVIRONMENT BOOK: WHAT'S AWRY AND WHY

Anne Pederson
John Muir Publications, USA (1991)
$17.95

This a is well-balanced, easy-to-understand environmental primer on the problems we face as a result of our past and present actions. It describes what's wrong, how things got that way, and how problems relate to one another. Suggestions on how we can all make improvements are included. In places, the book uses some basic science and clear diagrams to explain how things work; however, it avoids the pitfall of overloading the reader with scientific jargon and easily-forgotten facts. This book will help teachers and students keep the inter-connectedness of our global problems in focus. Two-colour illustrations and diagrams throughout.

THE KIDS' GREEN PLAN

Janet Grant
Pembroke Publishers Ltd., Can (1990)
$4.95

This hands-on activity book is designed to show young people how to develop their own special "green plan" to help the environment, from small local projects to national programs. Illustrated with black and white drawings.

THE MODERN ARK: ENDANGERED WILDLIFE ON OUR PLANET

Claire Littlejohn
Cecelia Fitzsimmons, Editor
Dail Books, USA (1990)
$19.95

A look at threatened species in eight different habitats. The book explains why wildlife is endangered in our planet's forests, polar regions, deserts, oceans and mountains. Full colour illustrations and an easy-to-assemble modern ark with thirty-two press-out animals.

THE RECYCLERS' HANDBOOK

The EarthWorks Group, USA (1990)
$7.95

This handbook contains lots of information and interesting facts about the resources we use and throw away, and covers the recycling basics as well as less-commonly recycled materials. It helps clarify the often contradictory messages received through corporate advertising, the media and environmental groups.

TRASH ATTACK!

Candace Savage
Douglas & McIntyre (1990)
$12.95

Trash Attack! teaches about where garbage comes from, why we make so much of it, where it goes to, and what happens to our air soil and water when we dispose of it.

Kids discover what the garbage crisis really is, and how to help solve it. Difficult topics are tackled in a lively and hopeful way. Full colour illustrations throughout.

2 MINUTES A DAY FOR A GREENER PLANET

Marjorie Lamb
Harper Collins Publishers, Ltd., Can (1990)
$14.95

This is another how-to-save-the-planet book - with a bonus. For every tree used to print this book, two were planted. Interestingly, reviewing the first draft of this book prompted the publishers to green-up their operation.

WASTE AND RECYCLING

Barbara Taylor
A & C Black, Ltd., UK (1990)
$9.95

This book explains how human activities affect the Earth and shows how you can help improve your local environment. Discover where waste comes from, how we dispose of it, and how we recycle some of our garbage to make new things. Full colour photographs and illustrations throughout.

WATER POLLUTION

Darlene R. Stille
Childrens Press Inc., USA (1990)
$6.95

This book covers the pollution of lakes, rivers, oceans and ground-water by industrial, agricultural and household waste, and clearly describes the environmental impacts of our polluting habits. The easy-to-read, easy-to-understand text is abundantly illustrated with colour photographs that clearly depict the mess humans are making everywhere.

WHERE DOES RUBBISH GO?

Sophy Tahta
Usborne Publishing Ltd., UK (1991)
$3.50

This book provides a wealth of easy-to-understand information on waste management. The simple text and detailed illustrations combine to answer questions on waste in clear, step-by-step stages.

WORLD ISSUES SERIES

The Environment
A Divided World
The Energy Crisis
Food or Famine
Population Growth
Endangered Wildlife

David Armitage, Series Designer
Wayland Publishers Ltd., UK (1988)
$16.95

Each title in this lively and informative series focuses on an important environmental issue, and examines the choices we have to make now about the kind of world we want to live in the future. Full colour photographs throughout.

YOUNG PERSON'S GUIDE TO SAVING THE PLANET

Debbie Silver and Bernadette Vallely
Virago Press Ltd., UK (1990)
$5.95

Over one hundred environmental issues are addressed in this A-Z format book for young people. Information on acid rain, water pollution, landfills, batteries, rainforests, television and the depletion of the ozone layer is designed to encourage direct action. The well-researched information is intelligently presented.

TEACHER REFERENCE

1001 WAYS TO SAVE THE PLANET

Bernadette Vallely
Penguin Books, UK (1990)
$12.95

This clear and easy-to-understand practical guide demonstrates how we can all play our part in making a difference to the future of our planet. It is based on the premise that the growing damage to the planet isn't being caused by someone "out there," but is fundamentally related to the way we live and consume.

ATLAS OF ENVIRONMENTAL ISSUES

Nick Middleton
Ilex Publishing Ltd., UK / Facts on File, Inc.,
USA (1989)
$21.95

This in an in-depth analysis of today's major environmental issues.

This atlas provides a new understanding of how human activities - urban, industrial, agricultural, and others - affect the world's air, soil, water, plants and animals. It contains plenty of full-colour illustrations, topographical maps and diagrams.

ATLAS OF THE ENVIRONMENT

Geoffrey Lean, Don Hinrichsen, and Adam Markham
Prentice Hall Press, USA (1990)
$28.95

This is presented in a unique, cartographic format that makes it easy to absorb large amounts of information at a glance. Each spread concentrates on one major issue – global warming, the condition of the oceans, the state of the ozone layer, energy resources, water supply, population growth, and many others. The maps, diagrams and tables are in full colour.

CANADIAN GREEN CONSUMER GUIDE

Pollution Probe
McClelland and Stewart Inc., Can (1989)
$14.95

This guide contains valuable material for the classroom at both primary and secondary levels. It contains lots of information, facts, tips and suggested actions on the 3Rs, and teaches that a few simple changes made by a great number of individuals add up to very much. Colourful illustrations throughout.

CONSERVING OUR WORLD SERIES

Acid Rain
Protecting the Oceans
The Spread of Deserts
Conserving Rainforests
Protecting Wildlife
Waste and Recycling
Conserving the Atmosphere
Farming and the Environment

Various Authors
Wayland Publishers Ltd., UK (1990)
$18.75 each

This series examines many topical issues concerning people and the environment. Each book looks closely at the threats to the environment and also the international measures taken to preserve it. Full colour photographs and diagrams.

EARTHRIGHT

H. Patricia Hynes
Prima Publishing and Communications, USA (1990)
$17.95

"As Pat Hynes rightly states in her very useful book, 'the environment is under siege'. Earthright represents a stirring, practical call for people everywhere to raise the seige, to reverse environmental destruction to reclaim our fragile home from the forces that injure it," Henry Kendall, Massachusetts Institute of Technology. It is a book about informed action, not just environmental information. Black and white drawings and tables.

EARTHRIGHTS: EDUCATION AS IF THE PLANET REALLY MATTERED

Sue Grieg, Graham Pike and David Selby
Centre for Global Education
World Wildlife Fund (1987)
$11.00

This book was produced as part of the WWF's Educational Programme in the UK to help and encourage teachers to integrate environmental and developmental issues into everyday teaching. It includes many useful teaching ideas. Black and white illustrations and photographs.

ECOLOGUE: THE ENVIRONMENTAL CATALOGUE AND CONSUMER'S GUIDE FOR A SAFE EARTH

Bruce N. Anderson, Editor
Prentice Hall Press, USA (1990)
$24.95

Ecologue is Nature's shopping list - a review of more than 600 products by name, complete with photographs, prices and ordering information. It makes no bones about which products help the environment and which ones harm it. This catalogue and guide is designed to help you make your home, garden and workplace part of the solution instead of part of the problem. Black and white photographs and drawings throughout.

ECOLOGY FOR BEGINNERS

Stephen Croall and William Rankin
Pantheon, USA (1982), (Random House,
Can Distributor)
$11.50

A handbook of witty drawings and eco-facts on past and present struggles with the environment. It gives the bare-bones basics on climate, agriculture, pollution and energy.

GAIA ATLAS OF PLANET MANAGEMENT

Dr. Norman Myers
Anchor Press, Doubleday, USA (1984)
$28.95

A comprehensive look at our planet, our resources, the damage we are doing and what needs to be done to restore the balance of nature. This book contains a wealth of information with superb full-colour maps, diagrams, illustrations and photographs on every page. It is a kind of blueprint for our survival and is an excellent resource for any level.

GREENPRINTS FOR CHANGING SCHOOLS

Sue Grieg, Graham Pike and David Selby
Centre for Global Education
World Wildlife Fund (1990)
$17.50

A handbook for all decision-makers in the education system which links the theory and practice of educational change. Greenprint looks at effective strategies for integrating environmental concerns into the curriculum. Through a series of case studies, the authors show how successful change at the institutional level depends on important attitudinal changes at the personal level. Black and white photographs.

GREEN FUTURE

Lorraine Johnson
Penguin Books, Can (1990)
$14.95

A well-researched action guide which explores the major environmental issues and shows how each of us can make a difference, and offers suggestions for positive action we can take on a daily basis. It is divided into sections such as the consumer, home, yard, garden and transportation. It is a useful resource for school projects. Black and white graphs and maps.

GOOD EARTH ART

MaryAnn F. Kohl and Cindy Gainer
Bright Ring Publishing, USA (1991)
$16.95

Good Earth Art offers a creative variety of art projects that develop an awareness of the environment and encourage a caring attitude towards the Earth. The book concentrates on using materials collected from nature, or saved from the garbage, can to demonstrate the usefulness of usually-discarded items and materials. Black and white drawings and diagrams.

HOW CAN ONE SELL THE AIR?

Postscript by Steef Davidson
Book Publishing Company, USA (1988)
$6.50

This is an interpretation of a speech delivered in 1885 by Chief Seattle of the Duwamish people to the president of the United States. A little-known work of great emotional power and beauty which can be used in conjunction with any topic on the environment.

KEEPERS OF THE EARTH

Michael Caduto and Joseph Bruchac
Fifth House Publishers, Can. (1989)
$22.95

This is designed as a teaching tool for parents and teachers with activities based on native stories which teach environmental understanding, appreciation and stewardship. The activities help children discover the world about them and to understand the influence they have on their surroundings. The book is designed for use at the primary level, and a Teachers' Guide is available.

LET IT ROT!

Stu Campbell
Storey Publications Inc., USA (1990)
$7.50

This book takes an easy-going approach to demystifying composting. It covers all the usual methods as well as some less usual ones. It is an excellent resource with a wealth of practical information on every aspect of compost-making, from composter construction to the end product. Illustrated with black and white drawings.

STATE OF THE ARK

Lee Durrell
Doubleday and Company Inc., USA (1986)
$28.95

Similar in format to Gaia: An Atlas of Planet Management, this book focuses on worldwide wildlife. It is an atlas of the state of the living planet - its ecosystems, habitats and species; the prospects for their survival; and the story of the conservation struggles to save what we can for future generations. It is packed with full-colour maps, diagrams, illustrations and photographs. It is an excellent resource for any level.

THE COMPLETE BOOK OF TRASH

Norm Crampton
M. Evans & Company, USA (1989)
$11.95

This book tells the reader how to dispose of trash safely and ethically, especially those hard-to-get-rid-of items such as batteries, paint, tires, etc. It is an excellent resource for projects on garbage and recycling.

THE HARMONY FOUNDATION HOME AND FAMILY GUIDE

Harmony Foundation, Can (1989)
$7.95

This guide is designed to help Canadians save energy and water, reduce waste and choose alternatives to hazardous products. The guide features practical tips, room-by-room checklists, a glossary and index, and Canada-wide sources and contacts.

THE SUPERMARKET TOUR: A HANDBOOK FOR ENVIRONMENTAL ACTION

Ontario Public Interest Research group (1990)
$6.00

A political tour of supermarkets, introducing the reader to such topics as agribusiness, consumer manipulation, food quality, additives in food, unfair trading practices, etc. Included are lists of resources and organizations which can provide additional material. Excellent for supermarket field trips and classroom discussion.

WHERE ON EARTH ARE WE GOING?

Jonathon Porritt
BBC Books, UK (1990)
$19.95

This book is a positive and articulate account of the alternatives that, with the right kind of vision and political will, are there for the taking. Full colour and black and white illustrations and photographs.

PRIMARY AND JUNIOR ENVIRONMENTAL FICTION

A GARDEN IN THE CITY

Gerda Muller
Simon and Schuster, UK (1989)
$7.95

This story shows that even in a city it's possible to have a garden and to grow things that attract all kinds of wildlife. Ben's and Caroline's new home has a garden large enough for them each to have their own plot. The story follows the development of the children's individual gardens as the seasons unfold, and is full of practical gardening hints and garden-based activities. Full colour illustrations throughout.

ATMOSFEAR

Sean O'Huigin
Black Moss Press, Can. (1985)
$4.95

Atmosfear is a serious warning to children that people everywhere have misused the Earth's resources and that it's about time we all sat up and realized it. Black and white and colour illustrations.

CONSERVATION

Robert Ingpen and Margaret Dunkle
Macmillan, A Division of Canada
Publishing Corporation (1988)
$12.95

Conservation is a thoughtful way of explaining to children how to make our world a healthy place for ourselves as well as for plants and wildlife. The book teaches about conservation by looking back into the past, by looking at the world about us today and by thinking about the future. Thoughtfully illustrated.

DON'T POLLUTE (ANYMORE)

Stan & Jan Berenstain
Random House, USA (1991)
$2.95

When the Bear Country's cubs learn about pollution, they set about teaching the grown-ups how they can clean up their act. A colourfully illustrated book for young children.

GARBAGE DELIGHT

Dennis Lee
Macmillan, Can (1977)
$6.95

This is a book of poems on different kinds of garbage, from junk food to mud puddles and sewers. Colourful drawings throughout.

HOW CAN ONE SELL THE AIR?

Postscript by Steef Davidson
Book Publishing Company, USA (1988)
$6.95

The year is 1885. Chief Seattle of the Duwamish people makes an impassioned plea to the President of the United States to protect the Native People's way of life at the time the authorities were offering to buy their land. Seattle asks, "How can one buy or sell the air, or the warmth of the land? That is difficult for us to imagine. If we don't own the sweet air and the bubbling water, how can you buy it from us?". This work can be used to stimulate discussions on how people, especially city dwellers, have become disconnected from the natural world. Illustrated with monochrome line drawings.

HOW SPIDER STOPPED THE LITTERBUGS

Robert Kraus
Scholastic Books Inc., USA (1991)
$5.95

A story about stopping litterbugs from littering to encourage young people to dispose of garbage properly. Full colour illustrations throughout.

IT'S OUR PLANET!

Mark Southgate
Little Brown Publishers, USA (1991)
$14.95

A collection of poetry about the survival of Planet Earth written by children, for children. The topics cover many different issues such as rainforest destruction, endangered species and nuclear dumping.

JILLIAN JIGGS

Phoebe Gilman
Scholastic Inc., USA (1988)
$4.95

Jillian loves to invent new games and play at dressing-up. Jillian and her friends create havoc outside in the yard and also in her room, and they're always too busy to clean up the mess they make. The way the children use their home environment can be likened to the way in which humans in general leave their garbage all over Earth.

The lively, full-colour illustrations contain many ideas for reusing unwanted materials.

JUNK PILE JENNIFER

John F. Green
North Winds Press, Can (1991)
$12.95

Jennifer loves junk. She is always collecting new treasures to add to her junk pile. The whole neighbourhood thinks she is completely crazy, but Jennifer doesn't care as she believes in the usefulness of the community's waste. One day she is proved to be right.

This story can be used to demonstrate the value of the materials we throw into garbage dumps and incinerators. Full-colour illustrations.

JUST A DREAM

Chris Van Allsburg
Houghton Mifflin Company, USA (1990)
$24.95

This is a story about an environmentally unenlightened boy called Walter, who believes that sorting trash is a big waste of time. One night while Walter is lying in bed, he wishes that he could visit the future. He falls asleep and his wish comes true. When he returns to the present, he is changed and so are his dreams. Illustrated in full colour by the author.

JUST A MESS

Mercer Mayer
Western Publishing Company, Inc., USA (1987)
$2.75

This is a story about not being able to locate misplaced things because of messiness and untidiness. Things get lost, damaged or broken if they are not taken care of. The story is simple but it could be used to teach children that replacing items uses up more of the Earth's resources, and that manufacturing new things causes more pollution. Damaged or broken things end up in garbage dumps where they may remain for hundreds of years. Colourful drawings on every page.

MR. RUMPLES RECYCLES

Barbara Anne Colthorpe
Hyacinth House Publishers, USA (1989)
$7.95

Three young people learn some valuable lessons from an old man thought to be the local village crackpot. The odd-looking containers Mr. Rumples keeps behind his house are actually compost bins. The kids learn about composting and recycling and adopt Mr. Rumples' motto – "stash it, not trash it." Colourfully illustrated throughout.

PIGS

Robert Munsch
Annick Press Ltd., Can (1990)
$4.95

This book carries a strong message about what can happen when things end up in places where they're not supposed to be. The illustrator claims that on certain days his school bus looked just like the one in this story. Amusing, full-colour illustrations throughout.

SONG OF THE SEA OTTER

Edith Hurd
Sierra Club, USA (1989)
$7.95

This book follows the adventures of a sea otter as it grows up. Concepts such as the food chain, evolution, migration and natural cycles are introduced. The book shows how life cycles and the food chain are affected by garbage disposal, littering, pesticide use and the pollution of the air, soil and water. Illustrated with monochrome line drawings.

THE GREAT TRASH BASH

Loreen Leedy
Holiday House Inc., USA (1991)
$21.95

Only after he slips on a banana skin does the Mayor of Beaston realize that there is too much garbage in the town. He calls a town meeting and suggests that all the animals go on a trash bash. Not only do they find ways to get rid of garbage, but they change their habits so that Beaston won't have a trash problem in the future.. Young people can learn how to get rid of garbage in their own communities by following Beaston's example. Full colour illustrations.

THE MAGIC SCHOOL BUS AT THE WATERWORKS

Joanna Cole
Scholastic Inc., USA (1986)
$4.95

Ms. Frizzle takes her class on a trip to the waterworks and travels en route via the water cycle. The book is full of interesting and accurate information on water presented in an unusually successful combination of fact and fancy. Lively, full-colour illustrations.

THE MAGIC SCHOOL BUS INSIDE THE EARTH

Joanna Cole
Scholastic Inc., USA (1987)
$4.95

Ms. Frizzle takes her class on a trip to investigate the composition of the Earth's crust and then drives underground to take the children on a journey to the centre of the Earth. There are lots of interesting facts on soil cycles, rock and soil types, and the ways in which people use different kinds of rocks, all presented in an amusing and lively way. Full colour illustrations throughout.

THE MAN WHO PLANTED TREES

Jean Giono
Chelsea Green, USA (1989)
$8.95

"Jean Giono's story of a man's generosity to nature - and through nature to other humans – surely belongs among the most endearing statements of hope" – Wendell Berry. This is an inspiring story for children and adults alike. Full colour illustrations.

THE PLANET OF TRASH

George Poppel
National Press Inc., USA (1989)
$15.00

This futuristic fable describes the journey to a mythical planet in the year 2052. The mission is to discover what happened to a polluted and lifeless place aptly named the Planet of Trash. Samples of filthy air, soil and water are collected, and mountains of ash, junked cars and old pop bottles are uncovered. The conclusion is that the planet choked to death on dirt and waste. Like all fables, The Planet of Trash leaves readers with a clear message. Lively illustrations and rhyming text tell the kids to pick up garbage, avoid littering and start practicing the 3Rs.

THE WATER'S JOURNEY

Eleonore Schmid
North-South Books, USA (1989)
$14.95

This book follows the journey of tiny drops of water evaporated off the surface of the Earth and carried up into the atmosphere where they freeze and form snowflakes. The snow falls high in the mountains, melts and joins springs, streams and rivers on its way back to the sea. The book is designed to give children a greater understanding of the water cycle and the role it plays in supporting life on Earth. Sensitive, full-colour illustrations.

THE WUMP WORLD

Bill Peet
Houghton Mifflin Company, USA (1970)
$6.95

This is a parable built on the subject of pollution and the waste of natural resources. The Wumps' planet is very similar to the Earth, and the settlers from Pollutus behave much like humans. Colourful illustrations throughout.

WATER

Brenda Walpole
A & A Black Publishers Ltd., UK (1991)
$6.95

This book describes some of the many uses of water, from drinking, cooking and washing, to ceremonial use. It explains such things as water and sewage treatment, and describes how water travels through reservoirs, water mains and a series of smaller pipes to reach houses and other buildings. Water facts and ideas for water-related activities are included. Full colour photographs and illustrations throughout.

ZEBO AND THE DIRTY PLANET

Kim Fernandes
Annick Press Ltd., Can (1991)
$4.95

Zebo was looking through his telescope one day from his own healthy green planet. He could see that one of the planets up in the sky was getting quite dirty. Zebo travelled by spaceship to the dirty planet to see what had happened to it. Upset by what he finds, he decides to rescue two of every kind of endangered species, including two young humans. The children travel back to his planet to see what their own dirty planet had once been like, and make up their minds to go home to let everyone know what the future on Earth could be like. "Three-dimensional" full-colour illustrations throughout.

CASSETTE TAPES

These cassette tapes are obtainable through environmental bookstores and local record stores.

A KID'S EYE VIEW OF THE ENVIRONMENT

Michael Mish
$12.95

These are songs that came out of the singer/composer's questions to children about their views on their environment. Words to the songs are included.

AMAZON DAYS, AMAZON NIGHTS

Bernie Krause and Wild Sanctuary
$10.95

The fragile, precious ecosystem of a Brazilian rainforest with the sounds of fifteen rainforest animals, including howler monkeys, red-billed toucans and frogs, set against the rhythm of a tropical downpour.

ATMOSPHERE SONGS - CHANSONS POUR L'ATMOSPHERE

$13.05

Mr. Ozone, Lewis Poulin, an artist from Sudbury, Ontario, has recorded a cassette tape for elementary students with six songs in English on one side, and in French on the other side. Titles include "Rap Your Own Lunch," "The Over-packaging Song" and "The Water Cycle Song." One dollar of the cost of the cassette is donated to environmental groups. Order from: Lewis Poulin, Box 20, Site 14, RR# 3, Sudbury, Ontario, P3E 4N1. Telephone: (705) 522-4405.

CONNECTIONS: FINDING OUT ABOUT THE ENVIRONMENT

Narrated by David Suzuki
$9.99

This forty-minute tape comes with a thirty-two page activity book to teach children about how we are all "connected."

SOLITUDE TAPES

Listen to the Loons
Storm on a Wilderness Lake
Dawn on the Desert

Among the Giant Trees of the Wild Pacific Coast
The Singing Humpbacks
Killer Whales and Friends
Sounds of the Arctic

Tapes cost approximately $12.00 each.

Solitude Tapes can be used in conjunction with relevant environmental and nature topics, for slide presentations, for background sounds for exhibits and dramatic performances on environmental issues, and for general mood-setting purposes.

THE BOX

The blue box rap song. "The Box" is Ruth Johnson's latest contribution to the environmental movement. This song highlights what the blue recycling box is for and what can be recycled. "Blue box, use the box!" Cassette with 30-second, and two 4-minute versions. Lyrics available.

WHAT'S IN THE SEA: SONGS ABOUT MARINE LIFE AND OCEAN ECOLOGY

Lyrics by Lois Skiera-Zucek
$12.95

A sing-along cassette to introduce younger children to whales, penguins, sharks and other marine life. Song titles include, "Mama Manatee," "The Smallest Plants and Animals" and "What Can I Do About Pollution?" The words to the songs are enclosed.

MAGAZINES

BUZZWORM INC.

Annual subscription: $18.00 (US) for six bi-monthly issues of Buzzworm - The Environmental Journal.
1818 16th Street,
Boulder, Colorado USA 80302

CANADIAN NATURE FEDERATION

Annual membership: $25.00 individual, $30.00 family
Members receive six issues of Nature Canada a year.
453 Sussex Drive, Ottawa, Ontario K1N 6Z4

CANADIAN WILDLIFE FEDERATION

Annual membership: $20.00
Members receive six issues of International Wildlife a year.

Annual subscription: $19.50 for twelve monthly issues of Your Big Back Yard for children aged 3-5.

Annual subscription: $20.00 for twelve monthly issues of Ranger Rick for children aged 6-12.
1673 Carling Avenue, Ottawa, Ontario K2A 3Z1

GARBAGE

Annual subscription: $29.00 (US) for six issues a year of Garbage – The Practical Journal for the Environment.

P.O. Box 51647,
Boulder, Colorado
USA 80321-1647

GREEN TEACHER

Annual subscription: $32.10 for one year, and $58.85 for two years, for six issues a year of Green Teacher.

Green Teacher,
95 Robert Street,
Toronto, Ontario M5S 2K5

This is a useful resource for teachers interested in the interchange of ideas for implementing environmental education in the curriculum. Regional editors have been set up across Canada to report on Canadian developments, and international scope will be retained by publishing articles from the UK-based Green Teacher and the forthcoming Australian edition.

P3 FOUNDATION

Annual subscription: $14.00 (US) for ten issues a year of Planet Three - The Earth-Based Magazine for Kids for children aged 6-12.

The goal of the non-profit P3 Foundation is to educate children about the environment. “P3” stands for planet three, or the third planet from the sun.

P.O. Box 52,
Montgomery, Vermont USA 05470

THE EARTH NEWS

Quarterly newsletter published by the Ministry of The Environment for Elementary school children - grades 3 to 7 - to provide them with the opportunity to share ideas and projects and learn more about environmental issues. Distributed to all elementary schools in Ontario via the boards of education. Available in English and in French. To order more call the Public Information Centre at (416) 323-4321.

YOUNG NATURALIST FOUNDATION

Annual subscription: $17.00 for ten issues a year of Owl Magazine for children aged 7-ll

56 Esplanade, Suite 304,
Toronto, Ontario M5E 1A7

VIDEO CASSETTES

THE NATIONAL FILM BOARD OF CANADA

The National Film Board (NFB) has a number of films and videos that address a wide range of environmental subjects such as acid rain, ground-water pollution, uranium mining, herbicides, pesticides, and the environmental and social disregard of specific multinational corporations. The films and videos can be rented from the NFB.

Rental Information

Reserve your videos and films up to 90 days prior to play date. If you cannot pick up your order, NFB will send it to you. All you pay for this service is the return shipping costs.

The service charge for borrowing videos and films is:

Video -	$2.00 per day (24 hrs.) per video
16mm Films -	$4.00 per title 30 minutes or less
	$6.00 per title 30.01 minutes or less
	$8.00 per title over 60 minutes
	plus Provincial Sales Tax

Shipping and return days are not charged. Films may be kept for up to 5 days.

Telephone to reserve or purchase videos and films:
Toronto (416) 973-9093/9110
Ottawa (613) 996-4861

For callers living outside Toronto and Ottawa, a bilingual toll-free service is available: 1-800-267-7710

ACID RAIN: A NORTH AMERICAN CHALLENGE

This video explores the environmental, economic and health effects of acid rain and reveals what needs to be done to reduce the damage it causes on both sides of the border. VHS video, 16 minutes, colour, available in English and French. Produced by the Ontario Ministry of the Environment. For information on how to borrow audio-visual materials, see "Reservations" at the end of this section.

ALTERNATIVE SOURCES

Other audio-visual materials may be borrowed from many sources, such as educational and community film libraries and public libraries, as well as from National Film Board offices. The NFB head office is located in Ottawa and may have listings for the regional NFB offices.

CARDBOARD RECYCLING — IT'S ALL IN THE CARDS (1988)

This 10-minute video deals with the implementation of the cardboard ban in the Halton Region. It was produced for the commercial/industrial sector. Available in VHS. Contact Halton Region Public Works, Waste Reduction Branch, Box 7000, Oakville, Ontario L6J 6E1, (416) 827-2151.

CLASS PROJECT: THE GARBAGE MOVIE (1980)

A 24-minute colour film (16mm only) from the National Film Board. People can call their local NFB office or the Toronto office at (416) 973-9110. A group of students working on a school project discover that garbage includes sewage, nuclear waste and even archaeological artifacts.

ENVO AND THE 3R'S (1989)

Envo, a visitor from the beautiful planet Venita, introduces children to the 3Rs program designed to alleviate Ontario's wasteful lifestyles and invites children to share their own ideas for reducing, reusing and recycling. VHS video, 12 minutes, colour, available in English and French. Produced by the Ontario Ministry of the Environment. For information on how to borrow audio-visual materials, see "Reservations" at the end of this section.

GLASS WORKS (1990)

A 12-minute video on VHS which portrays the glass recycling process from collection through to manufacturer. It also discusses the problem of contaminants. It can be borrowed by writing to Diane McCucheon, Consumers Glass, 401 The West Mall, Suite 900, Etobicoke, Ontario M9C 5J7.

LIFE AT THE LAKE

In Ontario there are some 250,000 inland lakes which are free to be used and enjoyed by all. However, these lakes are increasingly threatened by misuse and pollution.

Environment Ontario would like everyone to benefit from clean lakes, but it is impossible for the ministry alone to monitor changing lake and environmental conditions. It's up to us to keep them clean. Cottagers can and should be a part of the effort to protect and preserve Ontario's lakes. VHS video, 8 minutes, colour, English only. Produced by the Ontario Ministry of the Environment. For information on how to borrow audio-visual materials, see "Reservations" at the end of this section.

MISSION : EARTHKEEP (1992)

An entertaining 15-minute educational video produced for the Ministry of the Environment on sound environmental practices, aimed at elementary school children. Accompanied by a teachers guide. Available in English and French.

OUR COMMON FUTURE – THE BRUNDTLAND REPORT

The video outlines the dramatic increase in human activity and technology in our world and the negative affects on our natural environment. It focuses on the need for all nations to unite to improve the application of technology in order to sustain our resources and our environment. VHS video, 12 minutes, colour, available in English and French. Produced by the Ontario Ministry of the Environment. For information on how to borrow audio-visual materials, see "Reservations" at the end of this section.

OUR WATER WORLD (1992)

A documentary illustrating the importance of water in Ontario. Outlines water pollution problems and shows how industry, the government and individuals are working to clean up our waterways and prevent future water pollution. Available in English and French. (Approx. length 25 min.)

PAPER RECYCLING – OUR GROWING INDUSTRY (1987)

This 15-minute video (VHS) shows how a variety of waste paper grades – cardboard, newspaper and high-grade paper – are collected, processed and remanufactured into new paper products. It is suitable for junior high and high school students and adults. It can be borrowed at no charge. Contact Domtar Packaging, Recycling Division, 66 Shornecliffe Road, Toronto, Ontario M8Z 5K1, (416) 231-2525.

PULLING TOGETHER (1989)

This video encourages industry to practise the 4 Rs of waste management. It outlines the extent of our waste management woes and what corporate citizens can do to help alleviate the problem. The video can be purchased for $25 from Jane Rowbotham, Peel Region at (416) 566-1511 or it can be borrowed for a 2-week period. Also available from recycling coordinators in Metro Toronto, Waterloo and Guelph.

RECYCLING IS SMART (1987)

This 9-minute video, hosted by David Suzuki, is an excellent general introduction to the why's and how's of municipal recycling. It shows how residential collection programs work, as well as how the collected materials are recycled by industry. Available in VHS or Beta, it is suitable for students aged 10 and up, and for adults. Contact the Recycling Council of Ontario for information on where to obtain it.

Ontario Recycling Information Service
Recycling Council of Ontario
489 College Street, Room 504
Toronto, Ontario M6G 1A5
960-0938 (Toronto area)
1-800-263-2849 (Ontario-wide toll free)

THE AIR WE BREATHE

Air pollution has natural causes, such as volcanic eruptions, but with industrial development it has become an increasingly serious problem. Environment Ontario is currently involved with several projects which are helping to alleviate this potential dilemma. Air monitoring techniques, energy conservation, stricter pollution controls and straightforward commitment are all working together to make the air we breathe cleaner and healthier. VHS video, 10 minutes, colour, available in English and French. Produced by the Ontario Ministry of the Environment. For information on how to borrow audio-visual materials, see "Reservations" at the end of this section.

THE MAGIC OF HOME COMPOSTING (1990)

Learn about the benefits of backyard composting in this humorous instructional video. Available in VHS only, this 13-minute video can be purchased for $21.60 (all inclusive) or borrowed (for free within Metro Toronto, for $10 outside

Metro). Contact Kathy Walford, Recycling Council or Ontario, 489 College Street, Toronto, Ontario M6G 1A5, (416) 960-1025.

THE SECOND TIME AROUND (1989)

In response to a growing number of requests to view Halton Region's processing facility for blue box recycling the Public Works department produced this 11-1/2 minute video. Available in VHS or Beta, it is suitable for the general public, school children and municipalities. Phone Halton Region at (416) 827-2151.

THE SOUND OF THE STREAM

The Solid Waste Environment Assessment Plan (SWEAP) describes the existing refuse disposal system in Metro; outlines the pros and cons of various waste management options — landfilling, recycling, incineration; and indicates how people can get involved in the SWEAP process. It is available in VHS or Beta and in a 28-minute version or an edited 12-minute version. Suitable for high school students, adults, public interest groups and municipalities. Contact SWEAP, 439 University Avenue, 20th Floor, Toronto, Ontario M5G 1Y8, (416) 392-2990.

WASTE

This 10-minute video is part of TV Ontario's series 'Take a Look.' "Jeffrey sees how garbage is part of the life cycle and plants a reverse garden to see the process of decay. Kate learns how old paper is made into new paper." For Grades 4-6. It is available from TV Ontario, Box 200, Station Q, Toronto, Ontario M4T 2T1, (416) 484-2637. On VHS, Beta or 3/4". The rental fee is $15 for three weeks.

WE RECYCLE (1987)

This 6-minute video is suitable for Grades 4-6. It features a boy and a girl. He has just moved from a community without a recycling program so she explains how it's done — from blue boxes to composting to oil recycling. On VHS or Beta. Cost: 1 copy - $21 plus tax and postage. 2-10 copies - $19 plus tax and postage. Contact OMNI Media Productions, 16 Woodburn Avenue, St. Catharines, Ontario L2P 2W7, (416) 684-9455.

RESERVATIONS

Audio-visual materials are not circulated by the ministry, but may be borrowed free of charge by writing to the address below. It is recommended that at least three weeks' notice be given and, if possible, alternate dates.

LM Media Services
115 Torbay Road
Unit 9
Markham, Ontario
L3R 2M9
(416) 475-3750

KITS

Teaching about the 3Rs doesn't have to be limited to classroom time. Many schools have adopted lunchtime 3Rs programs which not only involve the active participation of students, but also effectively help the school to reduce its garbage. Two student kits are currently available at cost. They include reusable containers, lunchbags and educational support materials for students, teachers and parents.

Litterless Kids
4 Glenmount Park Road,
Toronto, Ont. M4E 2M9
(416) 698-4196

Garbageless Lunch
c/o Addison-Wesley Publishers Ltd.
P.O. Box 580
26 Prince Andrew Place
Don Mills, Ont. M3C 2T8
(416) 447-5101

GLOSSARY

ENVIRONMENT
INFORMATION-
ENVIRONNEMENT

WINTER 1992

Ontario
Environment
Environnement

SOLID WASTE MANAGEMENT: A GLOSSARY OF TERMS

If you want to help protect the environment by reducing waste and to become more knowledgeable about waste issues, you will want to understand the language of waste management. Some of the words may at first appear to have no connection with solid waste, they are included because they relate to materials or processes which do play a role in waste issues. Other sources of information will have to be consulted if technical or legal details are required. Some commonly used abbreviations are found at the end.

ABSORPTION

The taking in of one or more substances by another, such as soil absorbing rain water or leachate.

ACIDIC SUBSTANCE

Anything which has an abundance of hydrogen ions; has a value less than 7.0 on the pH scale; often very corrosive. See *pH Scale; Corrosive Substance.*

ADSORPTION

The adherence, or attachment, of one or more substances onto the surface of another.

AEROBIC CONDITIONS

A situation in which there is an adequate supply of oxygen available (e.g. a compost heap that is mixed, or turned over, regularly).

ALKALINE SUBSTANCE

Anything which has a value greater than 7.0 on the pH scale; often very corrosive. See *pH Scale; Corrosive Substance.*

ANAEROBIC CONDITIONS

A situation in which there is an inadequate supply of oxygen available (e.g. within the well-compacted waste at a landfill site)

AQUEOUS SOLUTION

A solution of one or more substances dissolved in water.

ASEPTIC CONDITION

Free of disease-causing organisms.

BACTERIA

Microscopic organisms, some of which cause disease and some of which cause the decay of plant and animal material.

BALING

The mechanical compression of waste or recyclable materials into rectangular bales. Bales are easier to handle, store and transport than loose waste.

BIOACCUMULATION

The absorption and storage of a material within an organism which is not able to break the material down for elimination. The persistent materials often reside in the organism's fatty tissues, and the amount accumulates, or builds up, throughout the life of the individual organism.

BIOLOGICAL MAGNIFICATION

The apparent multiplying of persistent chemicals at every step of a food chain. When any organism eats another, it instantly obtains all the persistent chemicals which have bioaccumulated in the food source.

BIODEGRADABLE MATERIAL

Items, or chemicals, capable of being broken down, or decomposed, by natural biological processes, usually involving oxygen, moisture and microorganisms such as bacteria. It is a mistake to assume that the processes are quick, produce harmless products and are necessarily good for the environment. Note that biodegradable plastics have been synthesized using starch molecules. It is these starch molecules that the microorganisms digest, leaving the actual plastic molecules behind as 'plastic dust'.

BIODEGRADATION

Breaking down, decomposing, decaying or rotting, by natural biological processes. The processes may take a very long time. If the processes occur in bodies of water, they use up valuable oxygen which is needed by the aquatic organisms and often release nutrients which increase the rate of eutrophication.

BIOGAS

See *Methane.*

BLEACHING

The whitening of something, such as paper or fabric, often using chemicals. When chlorine is used as the bleaching agent, the resulting effluent is toxic.

BLISTER PACKAGE

Packaging which surrounds a product with a transparent plastic bubble mounted onto a cardboard or plastic board. Such packages are said to make the storage and display of the product easier and help reduce shoplifting, but they do not easily lend themselves to recycling.

BLUE BOX

A blue plastic box used by residents of many municipalities and rural areas to collect and store recyclable items and to carry these items to the curbside /roadside for collection.

BLUE BOX MATERIALS

The usual materials which are accepted in a community's blue box program (e.g. cans, glass bottles and jars, newspapers). Check your local area because many community programs now also include some types of plastic. It is very important to put only appropriate materials into your blue box. Putting in the wrong items require extra sorting procedures while others render the whole load of materials unsuitable for recycling. The kinds of materials collected in the Blue Box program are constantly changing. See *Recyclable Material.*

BOTTOM ASH

The residue which remains at the bottom of an incinerator after waste is burned. It is often toxic and creates disposal problems. See *Fly Ash; Incinerator.*

BOXBOARD

Stiff paper packaging, often called cardboard, used for cereal, tissue and detergent boxes; not to be confused with corrugated cardboard. Most boxboard has always been made using a certain amount of used paper, such as newspapers. See *Corrugated Cardboard.*

CARCINOGEN

A substance or agent (e.g. radioactivity) which causes cancer.

CERTIFICATE OF APPROVAL (C OF A)

A legal document which is required for the operation of any waste management facility under the *Environmental Protection Act.*

CLOSED-LOOP RECYCLING

Converting used material into material the same as, or similar to, the original (e.g. used newspapers into new newsprint and glass jars into glass bottles). Also known as primary recycling, this type of recycling is preferable because it is the most energy efficient.

CO-MINGLING

The intentional segregation of recyclable materials from general waste but allowing all recyclables to be mixed together during collection, requiring further sorting at another location. Co-mingling may save money during collection but the sorting is imperfect and loads of recyclable materials may be contaminated. As a result, the contaminated load of recyclable materials may be unacceptable for re-processing.

COMPOSITE PACKAGE

Any package consisting of more than one material; the more materials involved, the more difficult to recycle the package.

COMPOST

Partially decomposed organic matter which can be added to soil as a source of nutrients and a conditioner. Compost can be produced from kitchen wastes, such as vegetable peelings, and yard waste, such a grass clippings and leaves.

COMPOSTABLE MATERIAL

Anything which is capable of being composted, or biodegraded. All organic materials will biodegrade, but some should be avoided in backyard compost containers. For details, refer to general booklets on this topic or specific instructions which come with commercially available containers.

CONSERVER SOCIETY

A society whose responsible citizens make concerted efforts to reduce consumption of energy and material resources. Conserver citizens also alter their habits in order to reduce the production of waste and other materials which harm the environment.

CONSUMER SOCIETY

A society whose citizens meet their own ever-increasing demands with little regard for the amount of energy or material resources they use up and/or how the environment is degraded by the disposal of their wastes. High consumer demand became a strategic economic goal in many Western countries after World War II and was artifically stimulated through advertising.

CONTAMINANT

A substance, or form of energy, resulting from human activity, which causes an adverse effect on the natural environment, or impairs human use of the environment. Even a naturally-occurring substance can become a 'contaminant' if a human activity causes it to be in an amount or location where it is not wanted (e.g. phosphates, found in many soaps, are essential plant nutrients but cause harm to aquatic ecosystems when their concentration increases quickly and/or over the normal amount).

CONTAMINANT PATHWAYS

Simple or complex routes followed by contaminants as they move through various ecosystems. Contaminants may undergo various physical and chemical processes, but never really disappear. See also *Bioaccumulation; Biological Magnification; and Ecosystem.*

CORROSIVE SUBSTANCE

Anything capable of gradually wearing away other materials through chemical reactions. Very acidic or alkaline substances are corrosive and usually harmful to living tissue. Corrosive substances are considered hazardous under the law and must be disposed of carefully.

CORRUGATED CARDBOARD

Stiff paper packaging made of two flat layers on the outside and a ridged layer in the middle. Not to be confused with boxboard. Corrugated cardboard is commonly used to make boxes for many products. Old corrugated cardboard is easily recycled into new corrugated cardboard unless coated with wax, heavy paint or contaminated with food waste. See *Boxboard.*

CRADLE-TO-GRAVE MANAGEMENT

An approach to managing wastes, usually industrial and hazardous wastes, from the point of generation (the "cradle") to the final point of treatment and disposal (the "grave"). In Ontario, the cradle-to-grave management of industrial and hazardous wastes is enforced by means of a waste generator registration process and a manifest system for the transportation of hazardous waste to a certified treatment and disposal facility. See *Polluter Pays.*

CULLET

Glass that has been intentionally crushed prior to being mixed with other raw materials to make new glass products. The crushing may be done by munipalities or by the companies that actually reprocess the glass.

CURBSIDE/ROADSIDE RECYCLING

A recycling program in which people separate recyclable materials from general waste and place them at the curbside/roadside for collection.

DECOMPOSITION

See *Biodegradation.*

DECOMPOSERS

Microscopic organisms (e.g. bacteria and fungi) or small animals (e.g. worms and insect larvae) which digest or eat organic materials and produce a nutrient-rich material suitable as a soil conditioner. See *Ecosystem, Compost.*

DE-INKING

A chemical process which removes ink from recyclable paper. Often harmful wastes are produced. Recycling paper materials does not always include de-inking.

DISPOSABLE PRODUCT

Something designed to be thrown away after one, or just a few, uses.

DOMESTIC WASTE

See *Residential Waste.*

DRINK(ING) BOXES

Aseptic containers designed for convenient transportation and long-term storage of liquids such as fruit juices. They are an example of a composite package, consisting of paper, plastic and metal foil and are not suitable for closed-loop recycling. Some plastic recycling processors will accept a certain limited percentage of these containers with other mixed plastics.

DUMP (SITE) (NOUN)

Location where garbage is "dumped"; usually a site not approved to take garbage in the first place. Not to be confused with an approved and properly managed landfill site.

DUMP (VERB)

To discard waste materials. Often used to describe the careless disposal of garbage.

ECOSYSTEM

Any given area of the earth where living organisms (the "biotic components") interact with nonliving things (the "abiotic components") in an exchange of matter and energy (e.g. oxygen, nitrogen, water, carbon dioxide, etc). The basic unit of ecology. Ecosystems range in size from very small to very large. An ecosystem consists of three types of organisms: producers, consumers, and decomposers. Depending on how the boundaries of an ecosystem are defined, many organisms can be part of more than one ecosystem. Nutrient cycles and contaminant pathways may also involve more than one ecosystem.

EFFLUENT

Liquid waste, often from industrial processes. In many cases, effluent contains harmful contaminants which must be removed by a treatment process before it can be released into the environment.

EMISSIONS

Waste, often from industrial processes, in the form of gases or fine particulates released into the atmosphere. In many cases, air emissions into the environment contain harmful contaminants which must be removed to acceptable concentration levels.

ENERGY FROM WASTE (EFW)

The concept of burning waste in an incinerator and using the released energy to make steam or to generate electricity which could be used in a variety of ways (e.g. to heat buildings). See *Incinerator.*

ENVIRONMENTAL CHOICE

A label allowed by the federal government on particular items or brands which meet specific criteria; indicates that these items or brands are considered less harmful for the environment than others.

ENVIRONMENTAL ASSESSMENT (EA)

A detailed environmental study of a proposed project. The study includes an assessment of the need for the project, various alternatives to the project, potential social and environmental impacts, methods to reduce the potential for any negative effects, methods to remediate any problems which do occur, and monitoring techniques and frequency.

ENVIRONMENTALLY FRIENDLY

A term which many people think means 'good for the environment'. Since the manufacture, use and disposal of most products are not good for the environment, this term is misleading and often used as a marketing tool. If this label is used honestly, it may mean that the product or package causes less harm than others based on current information.

ENVIRONMENTALLY RESPONSIBLE

A term used to describe activities carried out, or choices made, when the people making the decisions have taken into account the potential impact of those activities, or choices, on the environment. Note that it is not the products, but the decisions, which are environmentally responsible (e.g. the choices to buy bulk food items and to carry reusable shopping bags back to the stores).

EUTROPHICATION

The gradual natural aging of a body of water. Eutrophication involves a series of related physical, chemical and biological changes in the aquatic ecosystem. It becomes a problem when its rate is increased because of human activity (e.g. addition of excess nutrients from fertilizer run-off, feedlot operations and inadequate sewage treatment).

FERTILIZER

Material, natural or synthetic, used to add nutrients to soil. Most chemical fertilizers contain a mixture of nitrogen, phosphorus, and potassium.

FINE PAPER

Good quality paper such as that used for photocopiers, computers, legal documents and writing; has long cellulose fibres. Can easily be recycled.

FLY ASH

Non-combustible particulates which are often emitted by incinerators but which can be removed by various pollution control devices. When removed, there is still a disposal problem. See *Bottom Ash; Incinerator.*

GARBAGE

A used material people no longer want and for which they can find no further uses. Also called: rubbish, refuse, residual (waste), and trash. Whatever its called, garbage is something we classify as such by putting in a container for collection and disposal. Unfortunately, much of what we call garbage often contains many items which are reusable or recyclable. See *Municipal Solid Waste.*

GARBAGE COMPACTOR

Special equipment for reducing the volume of garbage using pressure. Large models are used by communities to reduce the volume of garbage before burying it in a landfill. Small models used in homes may make people feel there is no need to recycle or choose items with less packaging.

GARBAGE-FREE LUNCHES

Lunches using reusable containers and utensils. Leftover food from a lunch goes into a composter. As a result, nothing becomes classified as "garbage."

GARBURETOR

Small electrical apparatus, usually attached to the kitchen sink, for grinding organic wastes before flushing them down the drain. Garburetors waste electricity and water and may put a strain on the community's sewage treament plant or family's septic system. Organic wastes should be composted instead.

GROUNDWATER

Water which exists in underground passageways in rocks and which flows in response to gravity; often the source of water for communities. See *Surface Water.*

HAZARDOUS MATERIALS

Things which are potentially harmful to living organisms because they are corrosive, inflammable, reactive or toxic. These items are not usually included with municipal solid waste.

HEAVY METALS

A group of metals including aluminum, zinc, chromium, nickel, copper, tin, silver, antimony, cadmium, arsenic, lead, mercury, iron and cobalt. These materials tend to bioaccumulate and also follow contaminant pathways through an ecosystem's food web. Heavy metals are often present in the bottom ash of incinerators and the leachate from landfill sites.

HUMUS

Nutrient-rich material resulting from the natural decay of organic material in the soil; similar to compost.

IGNITABLE SUBSTANCE

Anything which is easily set on fire. Such materials are considered hazardous and must be disposed of carefully. Same as flammable and inflammable; opposite of non-inflammable.

INCINERATOR

Facility for the burning of material, often garbage. Reduction in the volume of the material varies with the material being burned. Incinerators produce a residue, or bottom ash, which presents a disposal problem, and various gases and particulates, or fly ash, which should not be released into the atmosphere. See *Energy from Waste.*

INORGANIC MATERIAL

Material which is not derived from plants or animals; i.e. does not contain carbon.

IMPERMEABLE MATERIAL

Substance which is able to prevent the passage, or movement, of materials through it. Impermeable is a relative term. Nothing is completely impermeable forever. Clay is used to line landfill sites because it is considered impermeable to leachate. See *Permeable; Semi-Permeable.*

INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL (IC&I) WASTE

Solid waste generated by industries and businesses of all types, including shopping stores, restaurants, and offices; and institutional types of establishments, such as schools, hospitals, government offices, and universities. IC&I waste makes up about 60 per cent of Ontario's total municipal solid waste stream. See *Municipal Solid Waste; Residential Waste*;

LANDFILL SITE

An area of land used for the burial of wastes under controlled conditions. Often called a "sanitary landfill site." Landfilling involves the compaction of waste in sections, called "cells." The cells of waste are covered with soil at regular intervals. A properly designed landfill site includes plans for, site preparation, leachate and biogas control, final capping, site rehabilitation, final use, and perpetual monitoring.

LEACHATE

The liquid which results when rain or melting snow percolates through a material and carries with it dissolved materials picked up as it moves. Depending on the location, leachate may contain hazardous materials which could contaminate groundwater or surface water. Leachate has more heavy metals if the rain or snow is acidic.

LIFE CYCLE ANALYSIS

A way of determining the total amount resource and energy used and waste generated by a particular product at all stages of its development: from the resources extracted to make it, through to its manufacture in a factory, its sale in a store, its use by a consumer, the materials extracted from it to make new products, and its final disposal. Lifecycle analysis is still a relatively new science. It helps to compare the relative environmental impact of two or more types of products and packaging.

LITTER

Large or small quantities of unwanted waste carelessly left lying around. Anti-litter campaigns do make our streets and parks look better but do not contribute to an actual reduction of solid waste going to disposal.

LOW-GRADE PAPER

Paper which contains short cellulose fibres, has been chemically treated or had a special coating applied (e.g. newsprint, fax paper, boxboard and magazines); often of less value for recycling. See *Fine Paper.*

MATERIAL RECOVERY FACILITY (MRF)

A facility where specified materials are intentionally removed from mixed waste or where co-mingled recyclables are sorted into distinct categories.

METHANE

A naturally-occurring gas produced when organic material biodegrades without the presence of sufficient oxygen. It is often mixed with other gases. Because methane is smelly, flammable and can migrate through soil, it can cause problems at landfill sites or in the surrounding area. It can be collected and used for the generation of heat and elecricity.

MICROORGANISMS

Living things which can only be seen with the aid of a microscope or magnifying glass (e.g. bacteria).

MITIGATION

Techniques for preventing, avoiding or reducing the impact of an environmental problem, such as water pollution caused by the movement of leachate from a landfill site. See *Remedialion*

MOBIUS LOOP

Originally a mathematical symbol. A modified Mobius loop has been adopted as a symbol for recycling because it conveys the infinite use and reuse of materials. Its three arrows represent the three states of matter which can be recycled: solids, liquids and gases. The symbol is used by government agencies, oganizations and businesses. By convention, two types of Mobius loop symbols are often used to mean either something is "recyclable" or that it "contains recycled materials."

This symbol means that a product or packaging is potentially recyclable. However, use of this symbol may be misleading. A used material is recyclable if it is accepted by a community's recycling program. If it is not, then it is not really recyclable in that particular community.

This symbol means that a product or packaging contains recycled materials. This symbol has also been much abused. Properly used, the symbol should be accompanied by information indicating the percentage of recycled content and whether it is pre-consumer waste or post-consumer waste that has been recycled. See also *Recyclable Material; Post-Commercial Waste; and Post-Consumer Waste.*

MONITORING

The detection by various means of any existing or potential environmental problems created by a waste site, usually over a long period of time. In landfills, for example, perpetual monitoring is necessary to be sure that the gas collection system is functioning properly and the liner is not leaking.

MUNICIPAL SOLID WASTE (MSW)

More commonly referred to as garbage, this waste material is handled by municipal collection and/or disposal services. It includes two main types of solid waste: residential, or domestic, waste and industrial, commercial and institutional waste. Municipal solid waste does not include hazardous and liquid industrial wastes. Also known as garbage, refuse, rubbish and trash. Different municipalities make legal distinctions among these terms, but they are all forms of municipal solid waste. See *Industrial, Commercial and Institutation Waste; Residential Waste.*

MUTAGEN

A substance or agent (e.g. radioactivity) which causes genetic mutations.

MUTATION

An inheritable alteration of the genes or chromosomes of an organism; may, or may not, cause adverse effects.

NON-RENEWABLE RESOURCES

Materials that cannot be replaced by nature once they have been used (e.g. coal, oil and natural gas). Metals are also non-renewable, but these can be recycled.

NOT-IN-MY-BACKYARD (NIMBY)

A label often given to people who oppose the siting of waste disposal facility in their local communities. The concept of NIMBY has been much abused to include people with legitimate concerns about the environmental impact of a waste disposal facility.

ORGANIC MATERIAL

Substances originating from living things and containing carbon (e.g. potatoes, meat, oil and plastic).

ORPHAN SITE

Waste site which has been abandoned by its owners, and who cannot be found, or who refuse to pay for their cleanup. Usually the cost of cleaning up an orphan site is assumed by government. See *Polluter Pays.*

OVER-PACKAGING

Unnecessary extra layers of packaging. See *Packaging.*

PH SCALE

Used to measure of the acidity or alkalinity of a material. The scale ranges from 0 (very acidic) to 14 (very alkaline). Each unit on the scale represents a factor of 10 because the scale is logarithmic (i.e. pH=4 is 10 times more acidic than pH=5 and pH=3 is 100 times more acidic than pH=5). Something with a pH=7 is neutral (neither acidic nor alkaline). For example, lemon juice is acidic, while baking soda is alkaline.

PACKAGING

The wrapping, container or packing material used to enclose a product. For every product, there is a list of reasons why packaging is considered to be required, ranging from protecting breakable items to providing an advertising vehicle. In some cases, there are legal packaging requirements (e.g. for making the item tamper-proof or providing ingredient lists or instructions in both official languages). Some reasons for packaging are considered more valid than others. Each situation should be judged individually. Although safety is a critical factor, the effects on the environment of both production and disposal of the package must also be considered.

PARTICULATES

Finely divided solid or liquid particles, often included in emissions from industrial stacks.

PATHOGEN

Organism capable of causing a disease.

PERCOLATION

The slow movement of a gas or liquid through a porous material, such as methane or rain through soil.

PERMEABLE MATERIAL

A porous substance which allows the passage, or movement, of materials through it (e.g. sandy soil)

PHOTODEGRADABLE MATERIAL

Material which is capable of being broken down in the presence of ultraviolet (UV) radiation from the sun or artificial sources. Most plastics are photodegradable and require the addition of UV inhibitors if they are to be used outdoors (e.g. road signs).

PLANNED OBSOLESCENCE

The practice of designing products to wear out, break or become unfashionable so that replacement items or parts have to be purchased.

PLASTICS

A very large number of different, synthetic, organic compounds, usually made from products of the oil/ petroleum industry. Different plastics have a great variety of properties and, thus, have many kinds of applications. Because there are so many kinds of plastics, it is often difficult to include them in community recycling programs.

POLLUTANT

See *Contaminant.*

POLLUTION

The release of contaminants into the environment. Pollution abatement is the removal of contaminants from emissions or effluent before they are released into the environment. Even better than pollution abatement is pollution prevention which involves changing industrial processes/activities to ensure that they do not create contaminants in the first place.

POLLUTER PAYS

When applied to waste management: The idea that the person or persons responsible for generating wastes are responsible for bearing the costs of their management; and equally, they are responsible for bearing the cost of cleaning up the environment. See *Cradle to-Grave Management; Orphan Sites· Product Stewardship; True-Cost Accounting; Waste Generator.*

POLYCHLORINATED BIPHENYLS (PCBS)

A group of very stable organic compounds. PCBs had a variety of uses, mostly as electrical insulating fluids, until the mid-1970s, when they were banned for use in Canada. PCBs have been found in human tissues, rainwater, and many species of birds and fish. They have a tendency to collect in fatty tissue, degrade gradually, and to increase in concentration as they move up the food chain. PCBs have been associated with various reproductive disorders in birds. In Ontario, anything containing PCBs is considered to be a hazardous material.
See Bioaccumulation; Biological Magnification

POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

A group of compounds containing two or more aromatic (benzene) rings. A number of PAH compounds are known to be carcinogenic.

POLYETHYLENE TEREPHTHALATE (PET)

A lightweight, strong, transparent plastic; used to make large carbonated, soft drink bottles.

POLYSTYRENE (PS)

A plastic used to make clothes hangers, rulers and various containers. Polystyrene can be foamed to make drinking cups, plates, fast food containers and pellets or moulded for packing breakable materials. Originally made using CFCs and HCFCs, foamed polystyrene is now made using pentane, carbon dioxide or other gases as the foaming agent. *Styrofoam* is the commonly-used brand name of a blue-coloured foamed polystyrene rigid insulation.

POST-COMMERCIAL WASTE

Materials remaining at the end of any manufacturing process which are returned to that process to make more products (e.g. trimmings and cuttings at a pulp and paper mill).

POST-CONSUMER WASTE

Materials previously used by consumers at various locations, such as homes, offices, stores and institutions, and collected for recycling (e.g. cardboard boxes, photocopies, old notebooks glass bottles, cans).

POTABLE WATER

Water which is suitable for drinking by humans and for cooking. Sources include groundwater aquifers and lakes and rivers. Potable water supplies can be contaminated by wastes improperly managed or from leachate leaking from landfill sites. See *Leachate*.

PRE-CONSUMER WASTE

See *Post-Commercial Waste*.

PRIMARY RECYCLING

See *Closed-Loop Recycling*.

PRODUCT STEWARDSHIP

An approach to waste management which recognizes the responsibility of a product or packaging manufacturer to control/monitor the manufacture, shipment, storage, use and final disposal of any product. See *Polluter Pays*.

PULP

Soft, moist material resulting when wood is processed to make paper; consists mainly of cellulose fibres.

3Rs OF WASTE MANAGEMENT

Reduce, reuse and recycle - in that order - before disposal! A major goal of municipal waste management is to keep materials out of the waste disposal stream. The 3Rs form a hierarchy of actions to achieve that goal:

- First, encourage people to reduce at source the amount of products or packaging purchased, consumed or used;
- Second, encourage people to buy reusable products or packaging and to reuse the products or packaging as often and as much as possible; and then,
- Third, encourage people to participate in recycling programs.

The remaining material after the 3Rs are considered "residual waste." Note that it is wasteful to recycle a refillable and reusable container.

RECLAIM

To recover, or regain possession of, something in order to use it again.

RECYCLABLE MATERIAL

A material which can be recycled. Not to be confused with 'reusable'. Technically, most materials can be recycled; however there are not necessarily programs set up to separate, collect and process all recyclable materials. The term 'recyclable' is relatively meaningless unless a program exists to collect, reprocess and market the end-product. See *Mobius Loop*.

RECYCLING

Physically, chemically or biologically reprocessing something in order to use the material to make a new product. A recycling program involves much more than just the actual reprocessing. It involves also the continuous separation, collection and/or cleaning of the recyclable materials and the maintenance of stable markets for the recyclable materials and useful final end-products. See *Closed-Loop Recycling and Secondary Recycling.*

RECYCLED CONTENT

The percentage of the product or package which is made of recycled materials. See *Mobius Loop; Post-Commercial waste; and Post-Consumer Waste.*

RECYCLING DEPOT

A facility for the temporary storage of recyclable materials. In some areas, depots are used as drop-off locations by the public. In other areas, they are used by municipalities to store materials collected by trucks.

RECYCLING PLANT

Facility to which recyclable materials are taken to be reprocessed.

REDUCTION

The decrease in the quanity of waste produced through modified consumer practices and industrial production changes to generate fewer useless by-products. See *3Rs of Waste Management.*

REFILLABLE CONTAINER

A container which can be cleaned and filled several times after being used with the same or similar product (e.g. carbonated soft drink and Ontario beer bottles). Usually the refilling is done by the companies making the products.

REFUSE-DERIVED FUEL (RDF)

Fuel made from processed garbage; often pelletized.

REFUSE-FIRED STEAM PLANT

Facility which generates steam using the energy released by the incineration of garbage.

REJECT

To refuse to buy or accept a product or type of packaging because it is wasteful. Often referred to as an activity within reduction - the first "R" of the 3Rs of waste management.

REMEDIATION

Taking corrective measures to reduce or eliminate environmental problems caused by a waste site or by another project.

RENEWABLE RESOURCES

Resources which can be replenished by nature after being extracted or used by humans. Trees are often called a renewable resource; so is water, fish and wild game. In reality, however, these resources are renewable only to the extent that the rate of their extraction or use is less than the rate at which they are replenished by nature. Sometimes used in the same context as "renewable energy."
See *Non-Renewable Resources.*

REPAIR

To mend, or put into good condition, something which can then be reused instead of being thrown away. Often referred to as an activity within reuse - the second "R" of the 3Rs of waste management.

RESIDENTIAL WASTE

Waste produced by all types of households, including detached dwellings, row housing, condominiums and apartments. In Ontario, residential waste makes up about 40 per cent of the total municipal solid waste stream. See *Municipal Solid Waste.*

RESIDUAL WASTE

The materials remaining after all efforts have been made to reduce, reuse and recycle. Usualty, these materials have to be put in approved landfill sites. Only residual waste is properly refered to as "garbage." See *Garbage.*

RETURNABLE CONTAINER

Container which can be taken back to a specific location, often a store. In return, a person receives a refund of a deposit paid when product was originally purchased. Returnable containers are sometimes refilled (e.g. carbonated soft drink bottles); others are recycled (e.g. beer cans).

REUSABLE PRODUCT

Something which can be used again for the same, similar or different purpose. Reusing some items for craft purposes can give the items a second life prior to being discarded; provided that the items are not refillable container/returnable containers or if recyclable, that they are not used in ways which prevent them from being collected by in a recycling program.

REUSE

To use something again in its original form for the same or different purpose. See *3Rs of Waste Management.*

RISK ASSESSMENT

When applied to waste management: a way of measuring the significance of a waste problem for its impact on the environment or human health. Risk assessment is a relatively new and controversial field of study. There is often disagreement on how the environmental or health risk of a waste or waste disposal facility is to be measured.

SECONDARY RECYCLING

Recycling which makes entirely different products out of the reprocessed materials (e.g. making egg cartons from used newspapers; making a filler for asphalt from glass bottles; making a wood substitute from mixed plastics). These processes are not as efficient as primary recycling but are definitely better than landfilling the materials.

SEMI-PERMEABLE MATERIAL

Substance which allows the passage, or movement, of some selected materials through it. See also Permeable and Impermeable.

SHREDDING

Using various machines to reduce the size of waste materials in order to facilitate their reprocessing and / or disposal.

SHRINK-WRAP PACKAGING

Packaging that uses a thin layer of plastic, shrunk to the exact size and shape of the product; sometimes used to attach the product to a paper or plastic board. It is similar to, but tighter than, blister packaging. Such packaging does not easily lend itself to recycling.

SOIL CONDITIONER

Material useful when added to soils because of its nutrient content and/or its water-draining or water-holding properties. See *Compost*.

SOLID WASTE

See *Municipal Solid Waste.*

SOURCE SEPARATION

The purposeful segregation of used materials from municipal waste into specific material categories at the point of generation, or where the waste is created. The generator may separate recyclables from other waste, but further sorting is required. Some municipalities further sort recylables into separate compartments in the collecting trucks; others co-mingle the recyclables for sorting at another location. Curbside sorting is much more efficient, and the materials are much more marketable because they have less contaminants.

STYROFOAM

Trademark name for a specific type of foamed polystyrene used as rigid building insulation. There is no such thing as a "styrofoam" cup. See *Polystyrene.*

SURFACE WATER

Water that is found on the surface of the earth in lakes, ponds, rivers, streams, etc. See *Groundwater.*

SYNERGISTIC EFFECT

The result when two or more substances cause an effect that is greater than the sum of the effects of the individual substances.

TERATOGEN

A substance, or agent (e.g. radioactivity), that causes birth defects.

THERMAL POLLUTION

The release of heat-bearing wastes into the environment (e.g. water that is used for cooling by various industries becomes warm and is released into local surface water).

THROWAWAY SOCIETY

See *Consumer Society.*

TIPPING FEE

The amount of money charged by the operator of an approved waste disposal facility for receiving and managing waste. The charge is based on either the weight or volume of the waste. Often a tipping fee is higher than the actual operating costs of the facility, so that the extra funds can be used by a municipality for its 3Rs programs.

TRUE-COST ACCOUNTING

Recording all the costs - including the environmental and social costs - of managing the waste generated from the use of a particular product or packaging. Also known as "full-cost accounting," the sum total of all costs is usually what we as a society have to pay for the management of waste. Unfortunately, these costs are often not evident in the price of a product or a service. See *Polluter Pays.*

TOXIC SUBSTANCES

Materials, solid, liquid or gaseous, which are harmful, or poisonous. They are sometimes called 'toxics'; not to be confused with 'toxins'.

TOXINS

Harmful, or poisonous, substances created in, or by, living organisms, such as bacteria. They form a sub-group of 'toxic substances'.

TRANSFER STATION

Facility used to receive and temporarily store waste and/or recyclable materials until they are shipped to another site for reprocessing or disposal.

VERMICOMPOSTING

Composting using worms to digest the organic materials provided; can be done indoors. For details, refer to specific instructions/suggestions.

WASTE

Solid, liquid or gaseous materials left over after various processes in homes, schools, businesses, institutions and industries. Unwanted materials, previously thought to be useless, often are carelessly released into the environment. Many of the materials can be reused, recycled or not produced in the first place.

WASTE-DERIVED FUEL

See *Refuse-Derived Fuel.*

WASTE DISPOSAL

Placing waste for long-term storage in a landfill site or in an incinerator for partial destruction. Waste disposal facilities must be certified for use. Their purpose is to keep the waste from entering into the environment.

WASTE DIVERSION

Using the 3Rs of waste management as part of astrategy to keep used materials from going to disposal. See *3Rs of Waste Management.*

WASTE GENERATOR

The person, business, institution or industry which creates waste materials.

WASTE MANAGEMENT

The management of waste and used materials through the 3Rs and disposal. Proper waste management puts first emphasis on waste reduction, reuse and recycling, before disposal methods are used. See *3Rs of Waste Management; Waste Disposal.*

WASTE MANAGEMENT MASTER PLAN

A long-term plan for the design and implementation of a waste management system to service the waste needs of a particular area.

WASTE MANAGEMENT SYSTEM

All the facilities, buildings and equipment used for the collection, treatment and disposal of wastes, and for the reduction of used materials going to disposal. A complete waste management system consists of disposal and diversion components. A waste management system is defined for a particular "service area," which is the population living in one or more municipalities.

WASTEWATER

See *Effluent.*

WET/DRY RECYCLING

A program which involves the collection of both the regular dry recyclables, such as cans and bottles, and wet compostables, such as kitchen wastes.

SOME COMMONLY USED ABBREVIATIONS

C of A	Certificate of Approval
EFW	Energy From Waste
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
EPA	*Environmental Protection Act*
HHW	Household hazardous waste
IC&I	Industrial, Commercial and Institutional
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NIMBY	"Not In My Backyard"
OCC	Old Corrugated Cardboard
ONP	Old Newsprint
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
PET	Polyethylene terphathalate
PS	Polystyrene
3Rs	Reduce, Reuse, Recycle
RDF	Refuse-Derived Fuel

For more information on waste issues contact:

Ministry of Environment and Energy
Public Information Centre
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

(416) 323-4321
1-800-565-4923